AD-A130 140 REPORTS OF THE US - USSR WEDDELL POLYNYA EXPEDITION OCTOBER-NOVEMBER 1981.. (U) COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER NH S F ACKLEY ET AL. JAN 83 1/1

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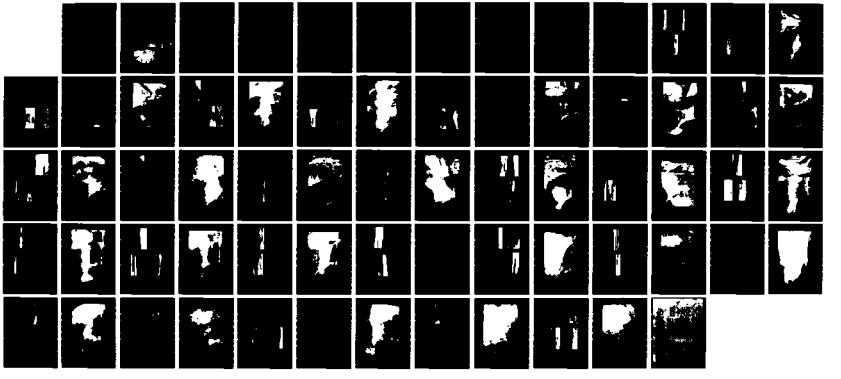
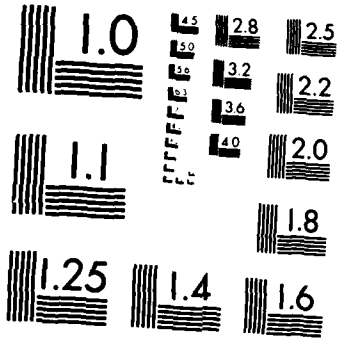




Reports of the

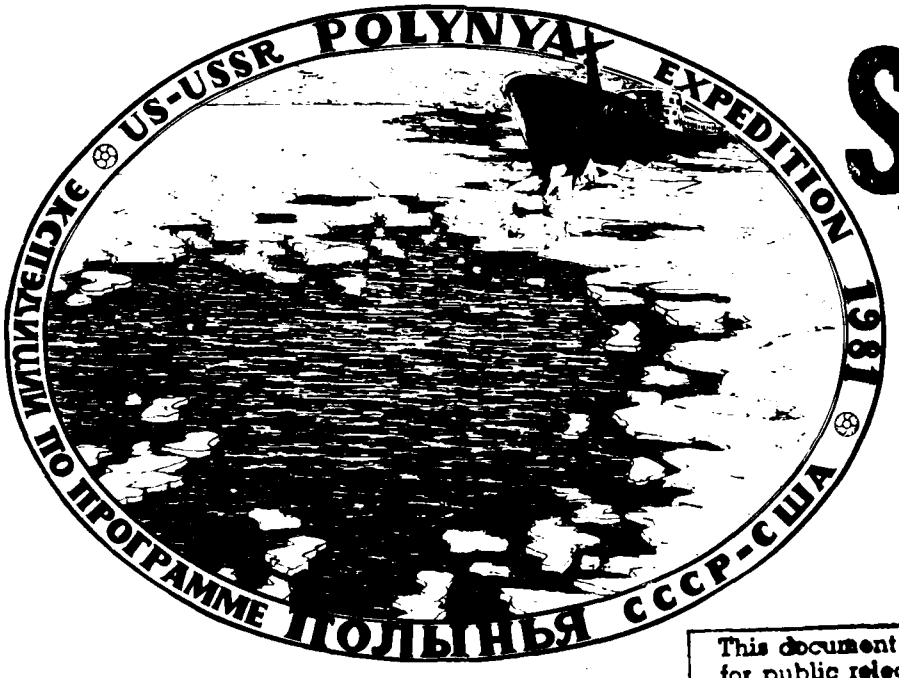
U.S. ~ U.S.S.R. WEDDELL POLYNYA EXPEDITION

October - November

1981

AD A130814

Volume 5
Sea Ice Observations



U.S. Army Cold Regions Research and Engineering Laboratory

1983

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Sea ice conditions recorded during the Weddell Polynya Expedition (Oct-Nov 1981) are presented in several formats. These include an ice conditions map prepared by the ship's meteorological crew, a narrative ice log supplemented by photographs taken by one of the authors, and daily satellite photographs. These are presented in a format compiling each day's conditions on one or two pages. These observations are being correlated with other satellite-based estimates of ice conditions, and with other oceanographic and meteorological measurements made during the expedition.

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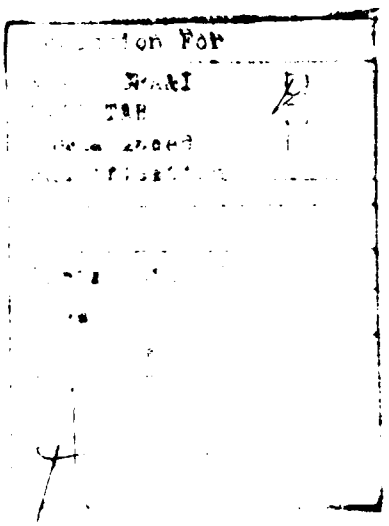
PREFACE

This report was prepared by Stephen F. Ackley, Chief, Snow and Ice Branch, Research Division, U.S. Army Cold Regions Research and Engineering Laboratory, and Sandra J. Smith, Mathematics Technician, SIB. The study was funded under National Science Foundation Agreement DPP-8006922, "Air-Sea Interaction and Sea Ice Studies of the Joint Weddell Polynya Expedition."

The authors thank the scientific and meteorological complements of NES Mikhail Somov for the observations pertinent to and preparation of the ice conditions map. Ivan Chuguy headed this effort and his cooperation is gratefully acknowledged. They also thank Diane Clarke of the Snow and Ice Branch for editing the narrative and clarifying ambiguities in the text by drawing on her own observations during the cruise.



WEDDELL POLYNYA EXPEDITION: SEA ICE OBSERVATIONS

Stephen F. Ackley and Sandra J. Smith

INTRODUCTION

This report contains data sets that describe the ice conditions encountered by the vessel Mikhail Somov during the Weddell Polynya Expedition. The expedition was a multidisciplinary effort consisting of physical oceanography, biological oceanography, chemical oceanography, sea ice studies, atmospheric boundary layer studies, and upper air observations during late winter and spring in the eastern part of the Weddell Sea (near 60°S latitude, 0° longitude) in areas covered by pack ice. Figure 1 shows the cruise track and study area in relation to Antarctica. A summary of the scientific activities is given in Gordon and Sarukhanyan (1982). Narrative cruise reports describing each scientific component in more detail may be found in the U.S. Expedition Report - WEPOLEX (Gordon 1982).

The ice conditions encountered are depicted in four ways. There were two sets of independent vessel-based observations: 1) An ice observation map was constructed by the Soviet scientific party based on visual observations of ice conditions at about 3-hour intervals (Fig. 2). 2) Visual observations were made and photographs taken at about the same intervals by a member of the American scientific party (see Appendix). Two other representations of the ice conditions were obtained by satellite imagery. One, transmitted by satellite directly to the vessel, consisted of visual band facsimile photographs (Appendix) from Soviet meteorological satellites (Meteor Series). The other was composed of weekly maps of ice conditions constructed by the Navy-NOAA Joint Ice Center in Suitland, Maryland. These maps were based primarily on microwave satellite images from the NIMBUS-7 Scanning Multifrequency Microwave Radiometer (SMMR) (Fig. 3).

The primary purpose of this report is to present these data sets in one accessible location. Some comparisons are made among the data sets. A more detailed discussion of the differences will be the subject of future reports.

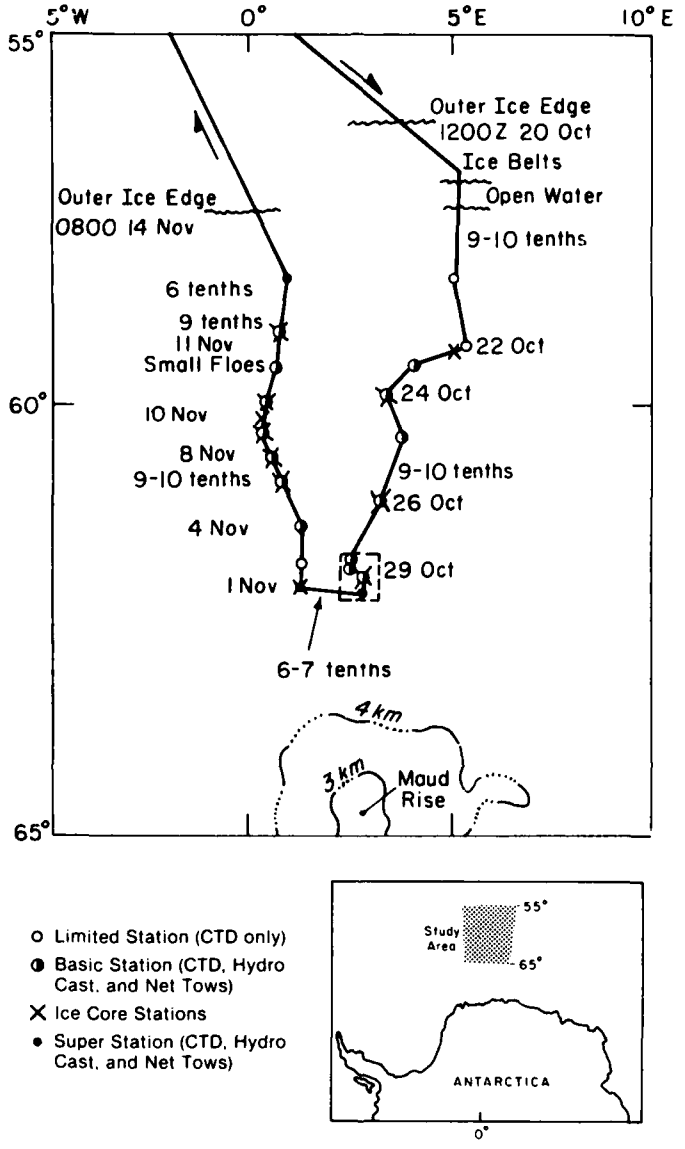


Figure 1. Cruise track of the NES Mikhail Somov, 20 Oct - 14 Nov 1981.

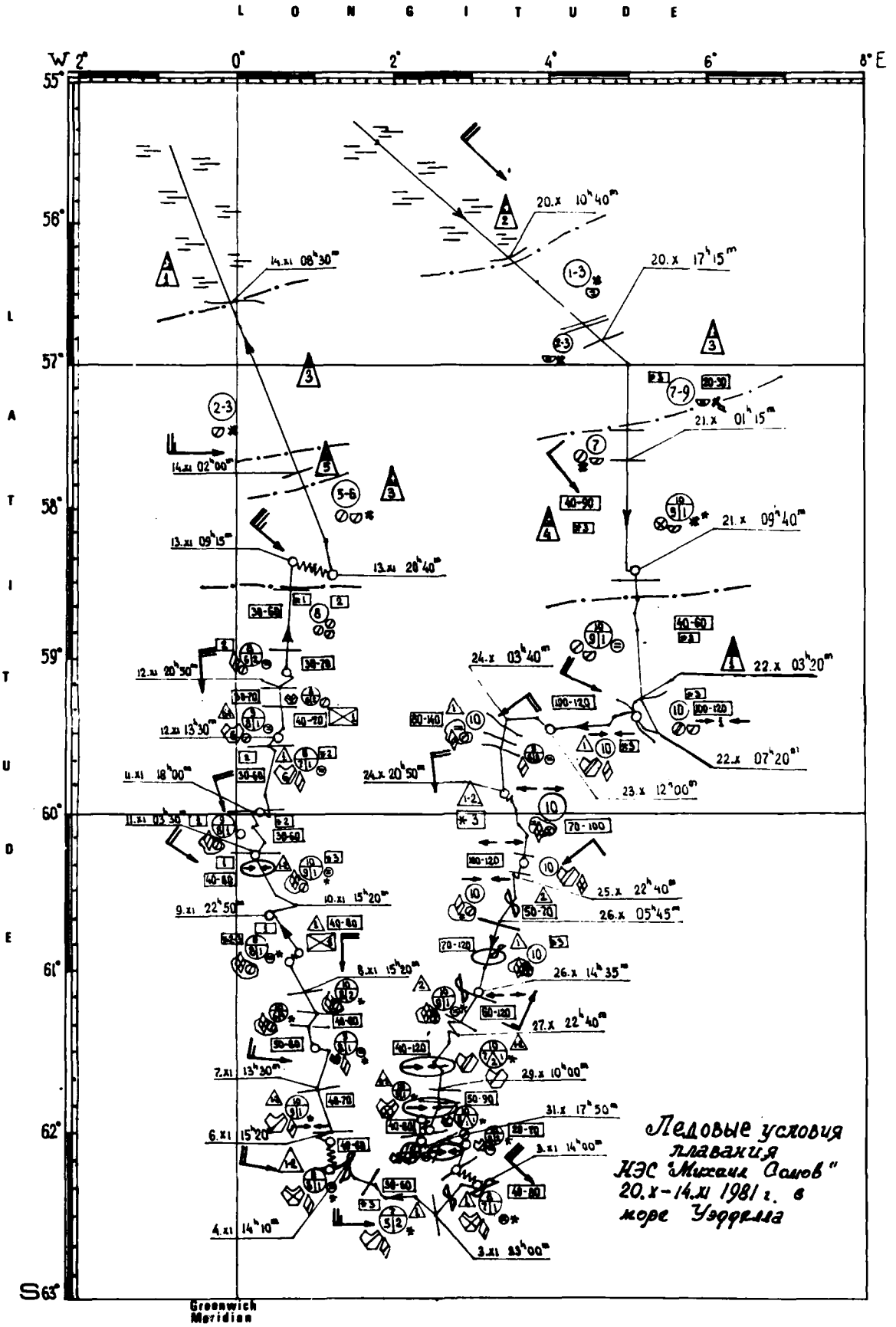


Figure 2. Ice conditions during the voyage of the NES Mikhail Somov, 20 Oct - 14 Nov 1981 (20.x-14.xl 1981) in the Weddell Sea. (Prepared by Soviet party aboard ship.)

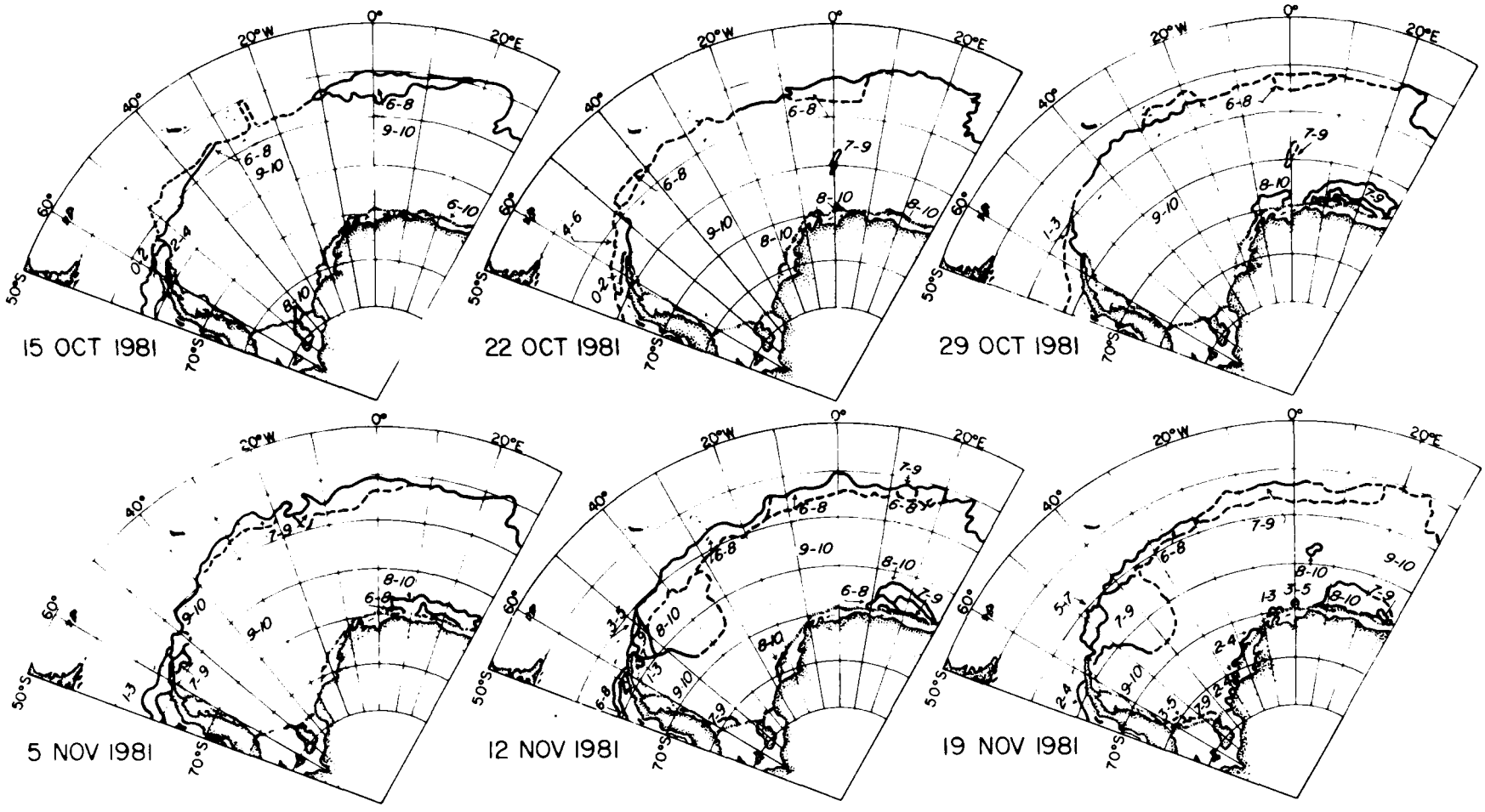


Figure 3. Sea ice extent and concentration during October and November 1981, taken from the Navy-NOAA Joint Ice Center maps.

ICE CONDITION DATA SETS

The ice map prepared by the Soviet party is shown in Figure 2. The ship's track is represented by the solid arrow-line.

The daily ice observation sheets in the Appendix are divided into the date plus five columns. The second and third (Hour and Symbols) columns refer to information taken directly off the ice map. The Description of Symbols (column 4) is a direct interpretation of the grouping of Russian symbols, each depicting a specific ice condition at that time and point along the ship's track. The symbols were interpreted by using a Russian-to-English dictionary and the Soviet Monograph "Sea Ice Nomenclature: Conventional Terms Used on Ice Maps" (1974). The final two columns (5 and 6) are visual observations of the ice conditions as described by S.F. Ackley in his ice observation log recorded aboard ship at the specific time and date in column 1. Photographs taken at ship level at the time indicated on the ice observation sheets are also shown.

For any given day some discrepancies can be seen between the ice map description (derived from the symbols) and the ice log narrative for corresponding times. These discrepancies are explained by the "averaging" technique apparently used by the ship's party in representing the ice conditions. The symbols on the map represent the overall ice conditions during some spatial (a few kilometers) or temporal (hours) period. The ice log narrative, on the other hand, describes the conditions alongside the ship at the time of the observation (± minutes) and within the visual range of the observer (less than about 1 km). If both techniques were used correctly, then the ice map representation should be the "sum" of the ice log observations for any given day. A number of factors will, however, introduce error into such a comparative procedure, including the frequency of the ice log observations, observer bias (both in detailing ice characteristics and in regional averaging), ship speed, and weather conditions (visibility). In most cases, there is reasonable agreement between the map and the ice log narrative; where there is not, one or more of the factors described above are responsible.

Figure 3 shows the weekly ice maps for the Weddell Sea sector prepared by the Navy-NOAA Joint Ice Center (after Gordon, in press). The major feature shown on these maps is the relatively high ice concentration (9-10 tenths) in the interior regions of the pack ice. On 22 and 29 October 1981

an area of reduced concentration (7-9 tenths) appears in the region of 65°S, 0° longitude. This feature at the time of observation was thought to be "polynya-like." However, as shown on the later maps (5 and 12 November) the ice concentration subsequently increased. This feature was also detected on the Soviet meteorological satellite images (Appendix), thus verifying the microwave interpretation of the lesser concentration.

The meteorological satellite photo for each day (with grid overlay indicating geographical coordinates) is shown on the page adjacent to the same day's ground-level ice observation sheets in the Appendix. If the ice cover is not obscured by clouds, these photos can give a regional-level view of ice conditions. For reference the ship's position on the indicated day is shown by a dot on the satellite photo.

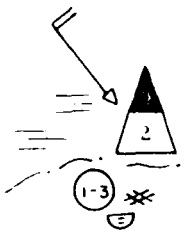
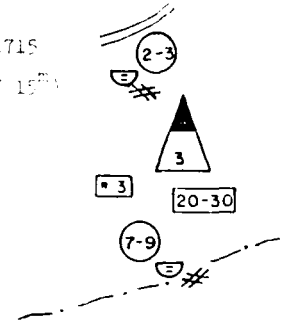
LITERATURE CITED

Gordon, A.L. (Ed.) (1982) U.S. expedition report - WEPOLEX 1981. Lamont-Doherty Geological Observatory Miscellaneous Paper.

Gordon, A.L. and E.I. Sarukhanyan (1982) American and Soviet expedition into the Southern Ocean sea ice in October and November 1981. EOS, vol. 63, no. 1, p. 2.

Gordon, A.L. (in press) The US-USSR Weddell Polynya Expedition. Antarctic Journal of the United States.

Nomenklatura morskikh l'dov. Uslovnye obozhnacheniia d'lia ledovykh kart (Sea ice nomenclature. Conventional terms used on ice maps.) (1974) Leningrad, Gidrometeoizdat (CRREL Bibliography 30-737).

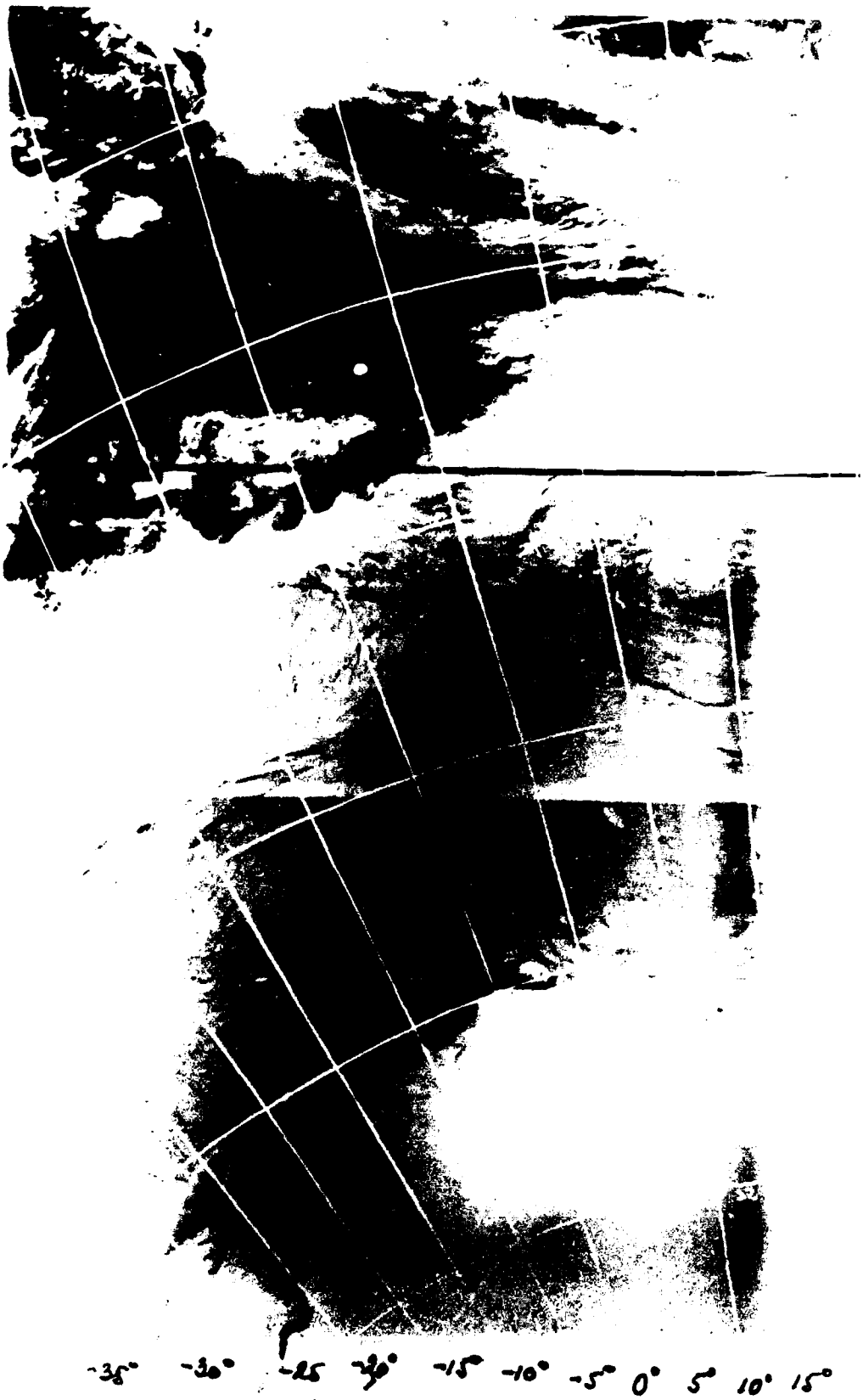
DATE	HOUR	SYMBOLS	DESCRIPTION OF SYMBOLS
			Wind direction NW. Wind speed 10 m/s. Berry water (concentration 2 on scale of 0-9). Ice edge region. 1-3 tenths concentration brash ice and ice cakes (2-20 m diameter and 15-30 cm thickness).
			
1715			Small lead. 2-3 tenths concentration composed of ice cakes (2-20 m diameter; 15-30 cm thickness) and brash ice (<2 m diameter). Iceberg concentration 3 on scale of 0-9. Still in ice edge region. Snow encrusted ice (concentration of 3 on scale of 0-3). 7-9 tenths concentration composed of ice cakes (2-20 m diameter; 15-30 cm thickness) and brash ice <2 m diameter). Average ice thickness 20-30 cm.

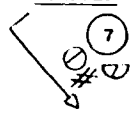
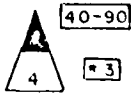
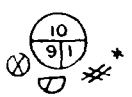
HOUR	REMARKS FROM ICE OBSERVATION LOG
	
1115	First small chunks of ice appear.
1139	Small bits and pancakes (concentration less than 1 tenth).
1143	Plume of pancakes and small broken floes.
1156	Open water, between ice edge plumes.
1200	Low concentration (1 tenth).
1213	Change from brash plume to small broken floes (1-2 tenths concentration).
1304	Open water entering highly concentrated plume of small floes and brash.
1345	Small bands between lots of open water. Some older ice with ridges, floe size approximately 5 m.
1521	Band and plumes; floe size 3-5 m across. Long period swell.
1645	Plume of concentrated small floes, small bits of old ice. Snow covered ice. Floes 3-5 m across.
1717	Extensive band of small floes. More complete ice cover 4-6 tenths.
	
1756	7-9 tenths ice concentration. Band of first year floes 8-10 m diameter with brash/frazil between floes.
1309	10 tenths ice concentration. Small floes and brash.
1815	9 tenths ice concentration. Continued cover of small floes, first year ice.

DATE	HOUR	SYMBOLS
2[illegible] Oct 81		
(230.x)		

DESCRIPTION OF SYMBOLS

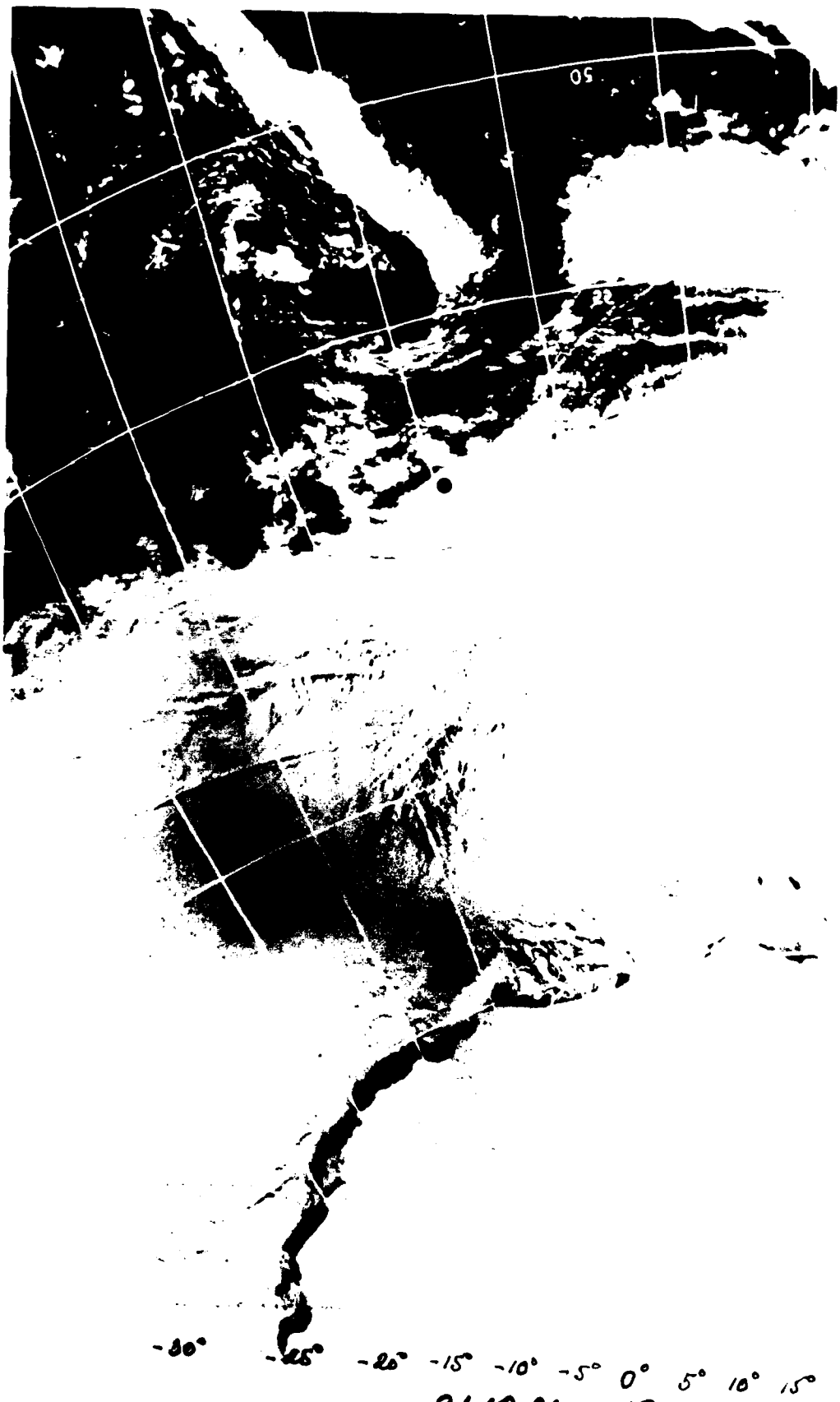
HOUR	REMARKS FROM ICE OBSERVATION LOG
1851	Lesser concentration (5-6 tenths). Frazil between floes.
1935	9-10 tenths ice concentration with new ice.
2115	9-10 tenths ice concentration, small floes. Continuous swell.
2121	9-10 tenths ice concentration. New ice between floes. Floe size increasing with several >10 m.
2126	Open water. Ice band appearing.
2131	Belts of small to medium floes alternating with bands of open water. Swell continues.
2240	Open water, entering band, some rafted and ridged ice. Floe sizes 8-10 m.
2304	Open water alternating with concentrated bands (3-6 tenths ice concentration).

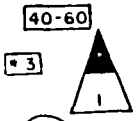
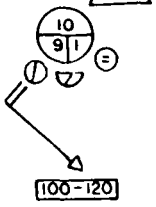
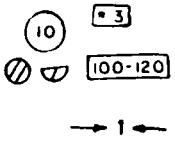

-35° -30° -25 -20° -15 -10° -5° 0° 5° 10° 15°
20.10.81 12 00 GMT

DATE	HOUR	SYMBOLS	DESCRIPTION OF SYMBOLS
21 Oct 81 (21.x)			Wind NW, 5 m/s. 7 tenths concentration of small floes (20-100 m diameter; 30-70 cm thickness), and ice cakes (2-20 m diameter; 30-70 cm thickness) and brash ice. Average ice thickness 40-90 cm. Icebergs (concentration of 4 on scale of 0-9). Snow encrusted ice (concentration of 3 on scale of 0-3).
	0115 (21[h] 15[m])		
	0940 (09[h] 40[m])		10 tenths concentration composed of 9 tenths small ice floes (20-100 m diameter; 70-120 cm thickness) and ice cakes (2-20 m diameter; 30-70 cm thickness) and 1 tenth brash ice (<2 m diameter) and light Nilas (5-10 cm thickness).

HOUR	REMARKS FROM ICE OBSERVATION LOG
0012	
0100	10 tenths floes and new ice.
0200	10 tenths floes and new ice.
0300	10 tenths floes; icebergs.
0500	8 tenths first year floes; 2 tenths new ice.
0600	Continued 10 tenths first year ice with 10%-50% new ice. 8-10 diameter floes, swell continues to propagate with estimated 3 mile amplitude.
0620	Continued 10 tenths first year ice with 10% new ice. All new ice looks like swell generated by oscillatory motion as pieces "jigsaw". Floe diameter maximum 8-10 m with some smaller pieces.
0720	10 tenths concentration, first year floes 5-15 m diameter. Diatoms. Substantial roughness but <.5 m. Approximately 10% new ice between older floes.
0730	Thickness approximately .5-1 m, color in center of blocks.
0803	10 tenths concentration, approximately 10% new ice (swell formed). Between 5-10 m diameter floes, swell continues.
0845	10 tenths concentration, slightly less new ice in the cracks formed by swell propagation. Floes 5-15 m diameter.
1234	Ice conditions 10 tenths concentration, small floes (8-10 m) separated by approximately 1% new ice. Swell continues.
1327	Ice conditions 10 tenths concentration, small floes 8-10 m diameter, approximately 1% new ice.
1653	10 tenths concentration small floes 5-15 m diameter. Very few ridges, approximately 1% new ice between floes. Swell continues but not as large as 1 m.

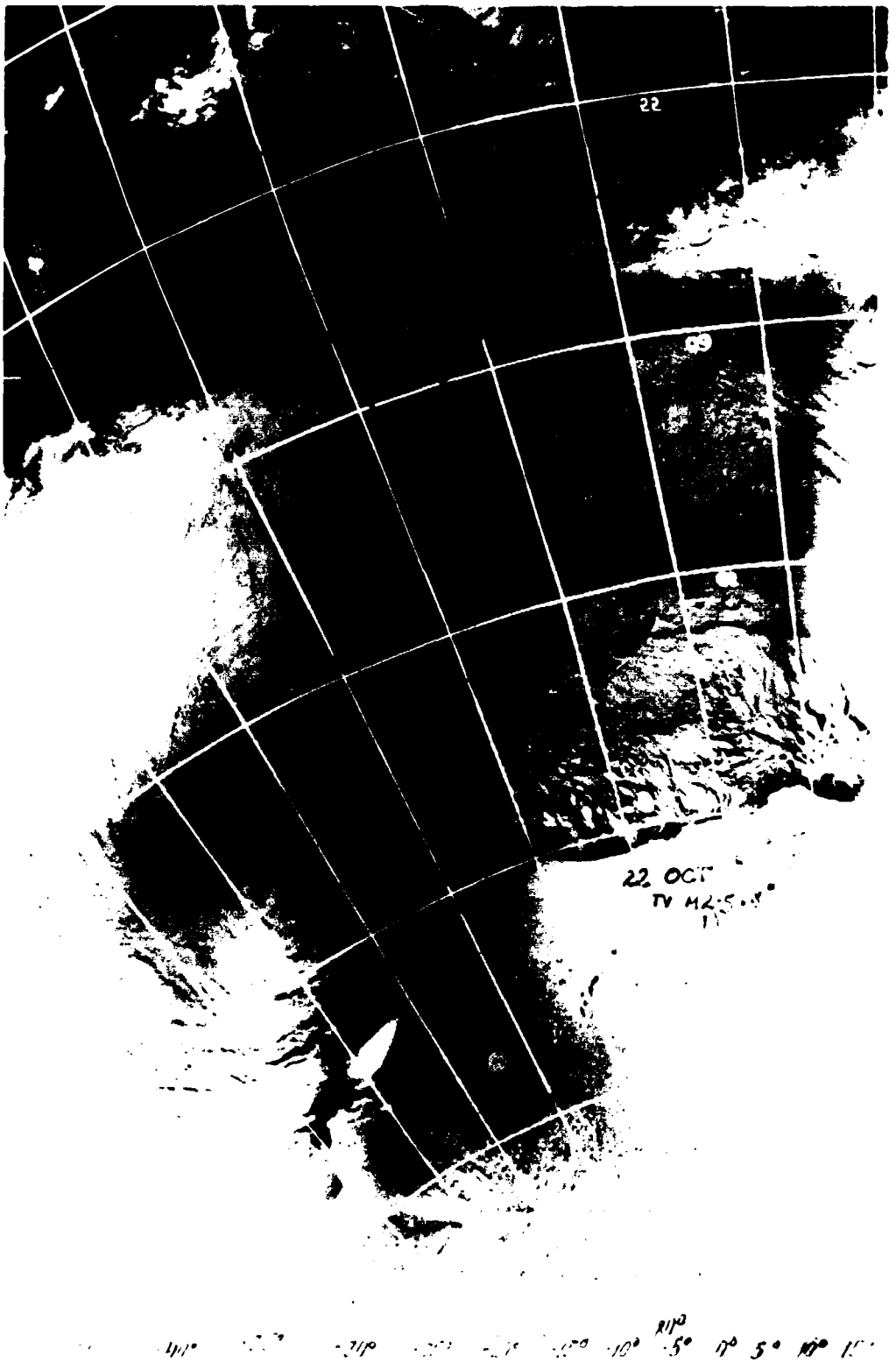
DATE	HOUR	SYMBOLS	DESCRIPTION OF SYMBOLS	HOUR	REMARKS FROM ICE OBSERVATION LOG
21 Oct 81				1917	Thicker floes, greater diameter. Swell amplitude diminished to approximately 1 m. Floe diameter increasing by about 2 to 20-25 m. New ice down to under [illegible].
(21.x)				1926	Ice concentration 10 tenths, 90-95% first year floes with new ice, 20-25 m diameter, swell amplitude still apparent.
				2023	Ice concentration 10 tenths. 90-95% first year floes 25 m or larger with new ice.
				2052	Concentration 10 tenths. Swell, broken floes 25 m diameter, fairly flat first year. Less new ice.
				2141	Concentration 10 tenths. Continuation of flat first year floes much less new ice than earlier in the day. 25 m diameter floes recently broken by swell action.
				2206	Slightly older floes. Snow drifting into small ridges, dunes, and barchans. Floes still broken recently but evidence for small ridges rather than new ice between the floes, diameter remains at 20-25 m.
				2247	Floe size continues to increase at 30 m diameter or greater. Older looking with packed snow surfaces.
				2323	Area of some convergence with young low ridging observed. 5-6 floes per ship length but longer axis usually normal so floe sizes of [illegible] m are clearly in evidence.

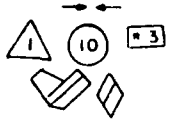

50
-30°
-25°
-20°
-15°
-10°
-5°
0°
5°
10°
15°
21.10.81 12 GMT

DATE	HOUR	SYMBOLS	DESCRIPTION OF SYMBOLS
22 Oct 81 (22.x)			Average ice thickness 40-60 cm. Snow encrusted ice, concentration 3 (on scale of 0-3). Iceberg concentration 1 (0-9 scale).
	0320 (03^h 20^m)		10 tenths concentration, composed of 9/10 small floes (20-100 m diameter, 30-70 cm thickness), and ice cakes (2-20 m diameter, 30-70 cm thickness); and 1/10 small floes (20-100 m diameter, 15-30 cm thickness). Wind speed 10 m/sec, NW direction. Average ice thickness 100-120 cm
	0720 (07^h 20^m)		Snow encrusted ice concentration 3 (0-3 scale). 10 tenths concentration consisting of small floes (20-100 m diameter, 120 cm thickness) and ice cakes (2-20 m diameter, 30-70 cm thickness). Average ice thickness 100-120 cm. Floes and ice cakes compacting; converging.

HOUR	REMARKS FROM ICE OBSERVATION LOG
0000	10 tenths concentration, floes thicker and larger.
0200	Thicker floes >1 m, >40 m diameter.
0306	Large ice chunks.

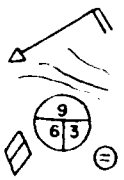
HOUR	REMARKS FROM ICE OBSERVATION LOG
0526	Evidence for convergence. Small ridges between floes.
0553	Heading North, under close conditions.
0720	Snow cover deeper, older floes.
0810	Iceberg.
1010	Ice conditions compact, older floes, 40-50 m diameter converging. Ice station, cores 1 and 2.
1827	Small floes, some flooding from swell action, leads. 8-9 tenths concentration.
1901	Small floes with leads, 8-9 tenths concentration. Lots of slush patches.
2104	Old ice with ridges 10 tenths concentration.
2230	Heavily ridged old ice. 10 tenths concentration.
2302	Close packed older ice, 10 tenths concentration.


22
22 OCT

DATE	HOUR	SYMBOLS	DESCRIPTION OF SYMBOLS	HOUR	REMARKS FROM ICE OBSERVATION LOG
23 Oct 81				0000	Heavy ice ridged and compact, 10 tenths concentration.
23.x[illegible]				0600	10 tenths concentration; heavily ridged rubble field.
				0757	In lead, newly forming grease ice and small pancakes. First year floes nearly continuous along lead. More lead and floe structure rather than floes. 9 to 9½ tenths concentration with leads. Ice drift 20 cm/sec to E. 150 m wide lead. Heavily ridged old ice on sides.
				0851	Traversing heavy ice through variable leads, 9½-10 tenths concentration.
				0940	Ice conditions variable, young first year ice alternating with more ridged material. Some leads. Diatoms in ice continuously.
				1042	Fairly flat first year floes, some small ridges between swell induced cracks. Highly concentrated.
				1120	First year floes, compact conditions.
	1200		Ice compacting. Ridging 1 tenth concentration (0-5 scale). Snow encrusted ice 3 tenths concentration (on scale 0-3). 10 tenths concentration composed of large floes (*0.5-2 km diameter, 120 cm thickness*) and medium floes (100-500 m diameter, 30-70 cm thickness)		
				1600	10 tenths concentration, compact conditions.
				1636	Slightly less than 10 tenths concentration, some leads, flat first year ice; some older ridged floes interspersed.
				1713	Stopped in rough old ice.
				1903	Highly compacted; first-year floes <1 m thick.
				2034	Thick first year floes, some ridging.
				2216	Stopped in heavy first year ice with ridges, tightly concentrated.
				2345	Compact 10 tenths conditions.

TV M2-[illegible] 23 12 71 11h37' GMT

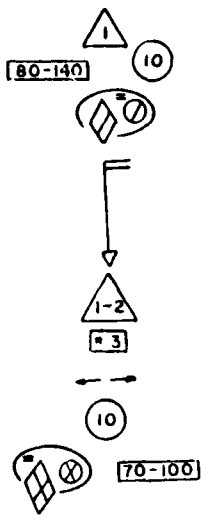
DATE	HOUR	SYMBOLS
24 Oct 81		
	0340	

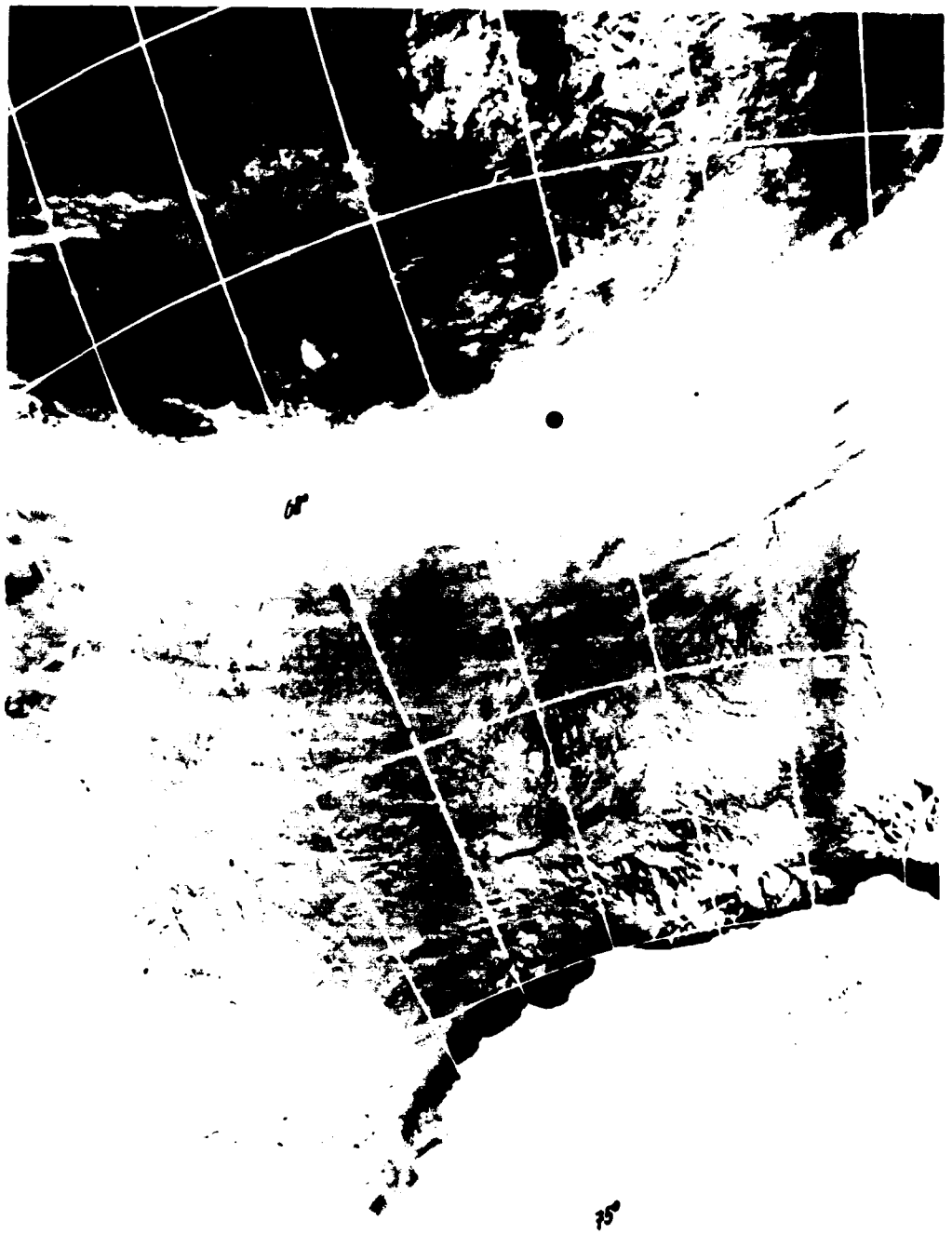


DESCRIPTION OF SYMBOLS

Wind speed 10 m/s, NE.
Some leads.
9 tenths concentration consisting of
6 tenths medium floes (100-500 m diameter, 30-70 cm thickness) and
3 tenths small floes (20-100 m diameter, 15-30 cm thickness).

HOUR	REMARKS FROM ICE OBSERVATION LOG
0000-0200	10 tenths concentration.
0256	Snowing.
0420-0700	10 tenths concentration.
0720	Ice looks very convergent, all old cracks closed with large floes and leads developing. Looks more like deep pack conditions.
0907	Narrow lead in 10 tenths concentration. Large floe lead structure, some ridges.
0926	Lead-large floe structure continues. Ice looks quite weak but compact conditions.
0937	Area of thinner ice.
1023	Pressure dropping, warm air. Ice conditions 9-10 tenths with leads.
1116	First year floes with narrow leads, 10 tenths concentration.
1225	First year floes with lead. Snowing, slush from snow forming in leads.
1253	First year floes with narrow leads, 10 tenths concentration.
1507	Traversing rubble field of old ice, several chunks.
1622	Ice station, cores 3 and 4.
1730	First year ice high concentration.
2010	Visibility, fog, 10 tenths concentration.

DATE	HOUR	SYMBOLS	DESCRIPTION OF SYMBOLS	HOUR	REMARKS FROM ICE OBSERVATION LOG
24 Oct 81 (24.x)	2050 (20^h 50^m)		Average ice thickness 80-140 cm. Ridging concentration 1 (0-5 scale). 10 tenths concentration ice Breccia composed of medium floes (100-500 m diameter, 120 cm thick) and small floes (20-100 m diameter, 30-70 cm thickness). Wind 10 m/s, N. Ice Ridging, hummocks 1-2 concentration (on 0-5 scale). Snow encrusted concentration of 3 (0-3). Pack ice motion diverging. 10 tenths concentration ice Breccia consisting of medium floes (100-500 m diameter, 70-120 cm thick) and small floes (20-100 m diameter, 70-120 cm thickness). Average ice thickness 70-100 cm.		



TV M.? 5 24/10. 81г 11ʰ35' ГМТ

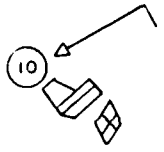
DATE	HOUR	SYMBOL	DESCRIPTION OF SYMBOL	HOUR	REMARKS FROM ICE OBSERVATION LOG
25 Oct 81				0300-0630	Following leads. 9-10 tenths concentration.
25.x				0700	Following leads, occasional rubble field.
				0855	10 tenths with narrow leads <10 m. Relatively thin first year floes (~ .5 m). 10 tenths with narrow leads, thin first-year floes (~.5 m). Some small ridges. Large floes with linear leads.
				0944	
				1127-1231	10 tenths with narrow leads. 11 rubble field, lots of snow cover. Heavily ridged.
				1452	First-year floes, occasional ridges and rubble fields.
				1928	10 tenths concentration encountering ridged ice.
				2133	10 tenths concentration, some ridged areas.
				2232	Ice conditions 10 tenths concentration first-year ice. Some ridges.

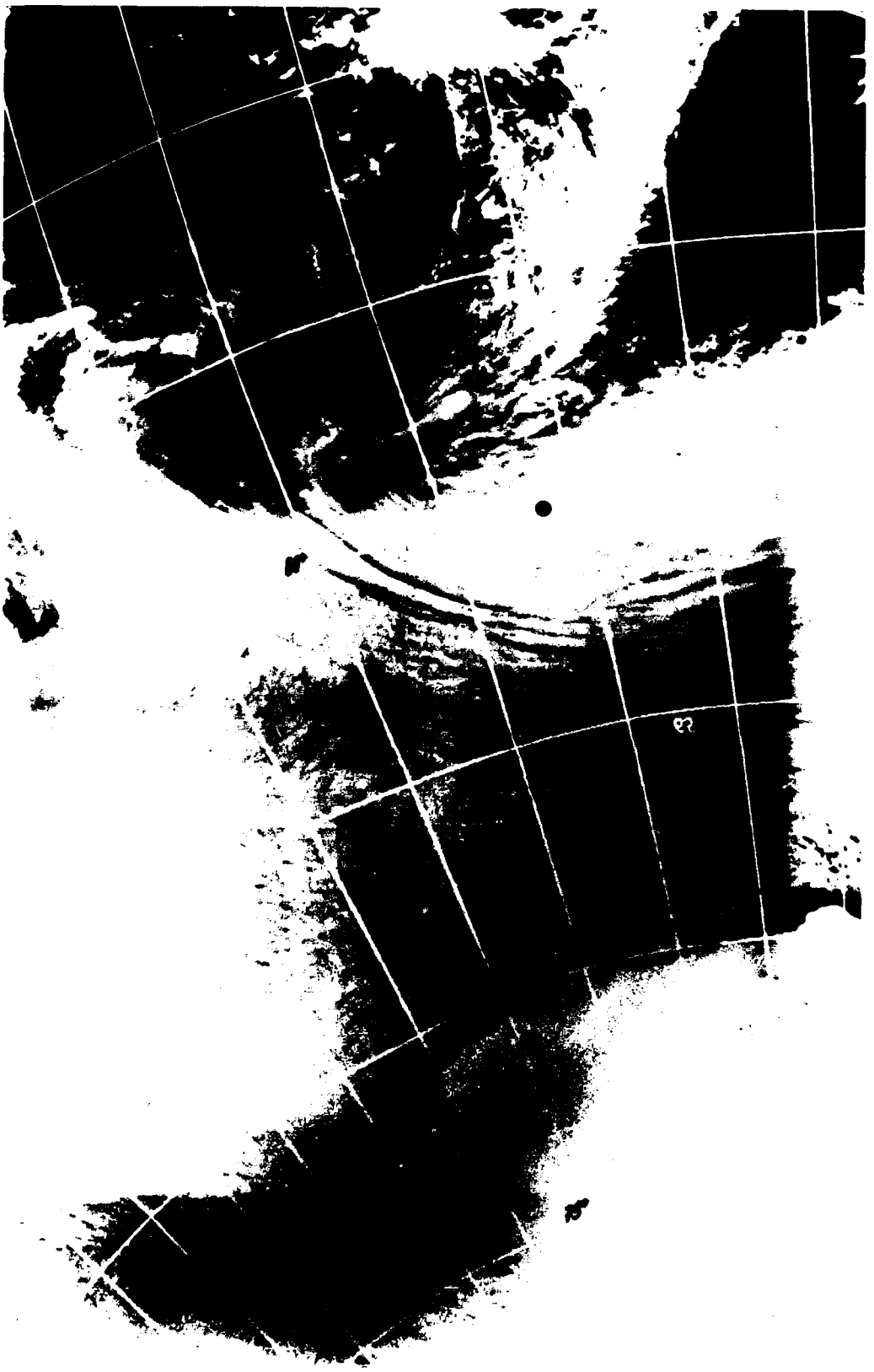
Pack ice motion - diverging.
Average ice thickness 100-120 cm.

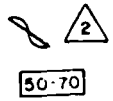
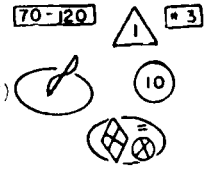
100-120

2240

Wind NE, 5 m/s.
10 tenths concentration composed of large floes (0.5-2 km diameter, 120 cm thickness) and medium floes (100-500 m diameter, 70-120 cm thickness).

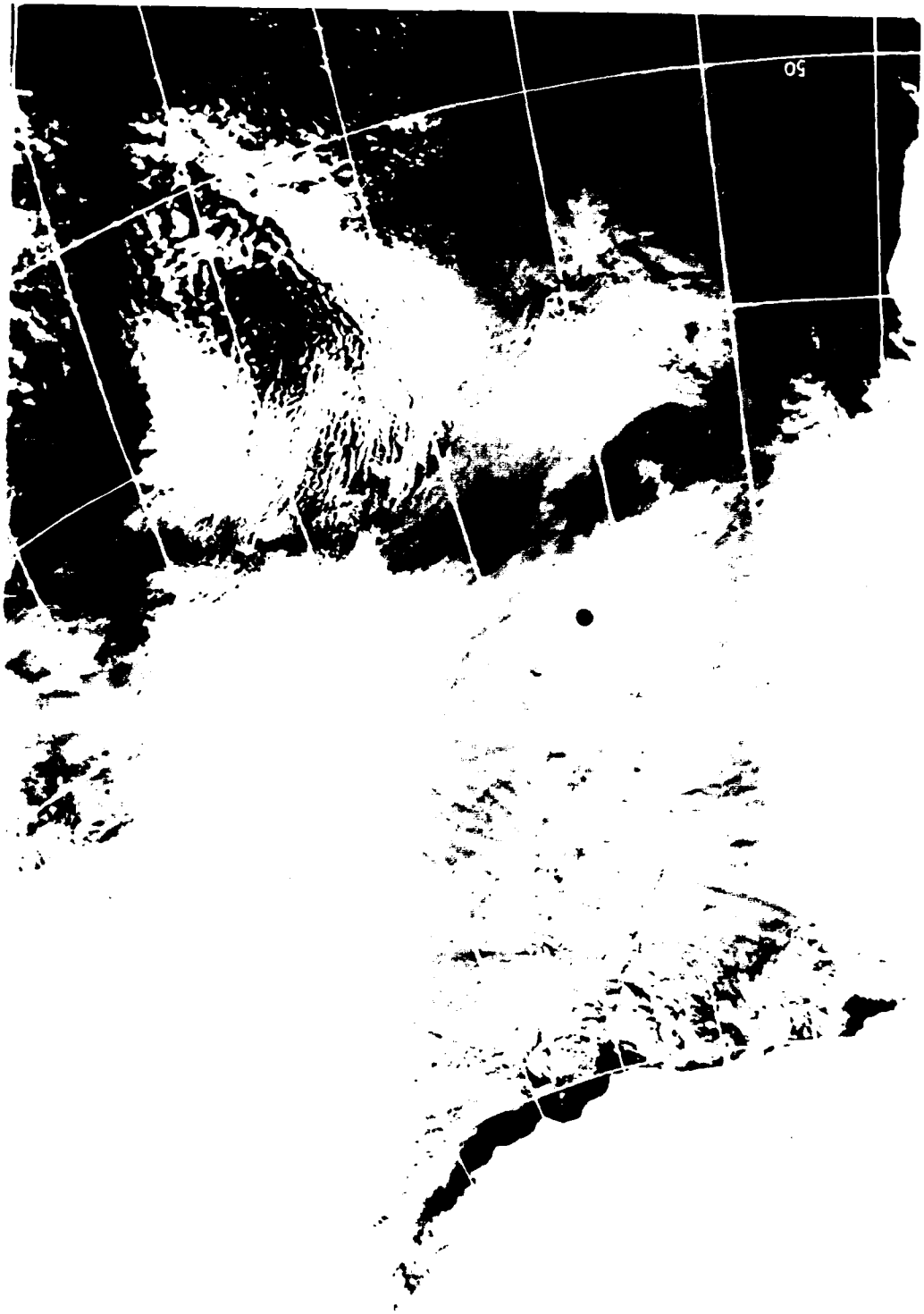



-40°
-30°
-20°
-10°
0°
10°
TV M2-5
25.10.81.
11h31'50" ГМТ

DATE	HOUR	SYMBOLS	DESCRIPTION OF SYMBOLS
26 Oct 81 (26.x)			Pack ice motion - converging. 10 tenths concentration. Ice Breccia consisting of medium floes (100-500 m diameter, 30-70 cm thickness) and small floes (20-100 m diameter, 30-70 cm thickness).
	0545 (5^h 45^m)		Ridging 2 on a scale of 0-5. Very small fractures (50-200 m). Average ice thickness 50-70 cm.
	1435 (14^h 35^m)		Average ice thickness 70-120 cm. Ridging concentration of 1 (scale 0-5). Snow encrusted concentration 3 (scale 0-3). Fracture zone. 10 tenths concentration ice Breccia composed of medium floes (100-500 m diameter, 70-120 cm thickness) and small floes (20-100 m diameter, 70-120 thickness).

HOUR	REMARKS FROM ICE OBSERVATION LOG
0238	Some leads; 10 tenths concentration.
0400-0800	Following leads.
0900	Large lead (200 m wide). Many leads, concentration down to 9 tenths.
0921	Ice 9-10 tenths, thin patches and leads.
1040	Traversing 9-10 tenths concentration, leads with first year floes; occasional ridge and rubble.
1134	Lead > 500 m, occasional rough spots at corners.
1154 – 1407	Lead 9-10 tenths concentration. Some thin ice possibly slush from snow. Lead and large floe structure, first year floes.

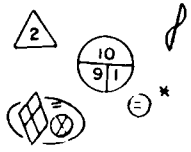
HOUR	REMARKS FROM ICE OBSERVATION LOG
1455	Ice concentration 10 tenths with leads.
1705	First year floes with occasional rubble and pressure ridge areas, 10 tenths concentration.
1715	First year floes. Ice station, cores 5 and 6.



-40° -30° -20° -10° 0° 10°

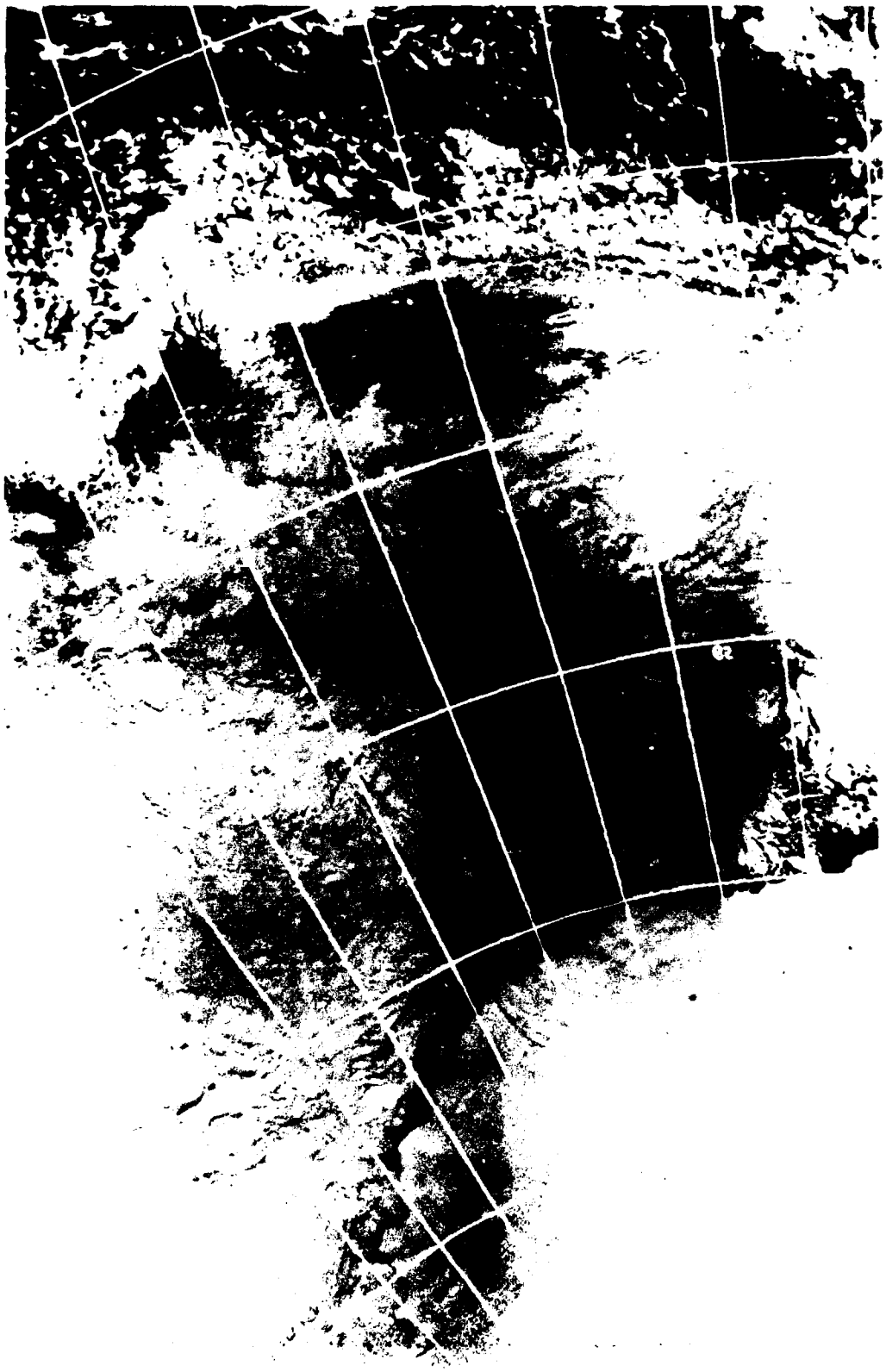
TV M[illegible] [illegible] 11[illegible]0" GMT

DATE	HOUR	SYMBOLS	DESCRIPTION OF SYMBOLS
27 Oct 81 (27.x)			



Ridging concentration 2 (scale 0-5).
Very small fractures (0-50 cm).
10 tenths concentration; 9 tenths ice
Breccia composed of medium floes (100-500 m diameter, 70-120 cm thickness) and small floes (20-100 m diameter, 70-120 cm thickness); and 1 tenth small floes (20-100 m diameter, 15-30 cm thickness) and light nilas 5-10 cm thick.
Pack ice - diverging.
Average ice thickness 60-120 cm.
Wind SE, 7 m/s.

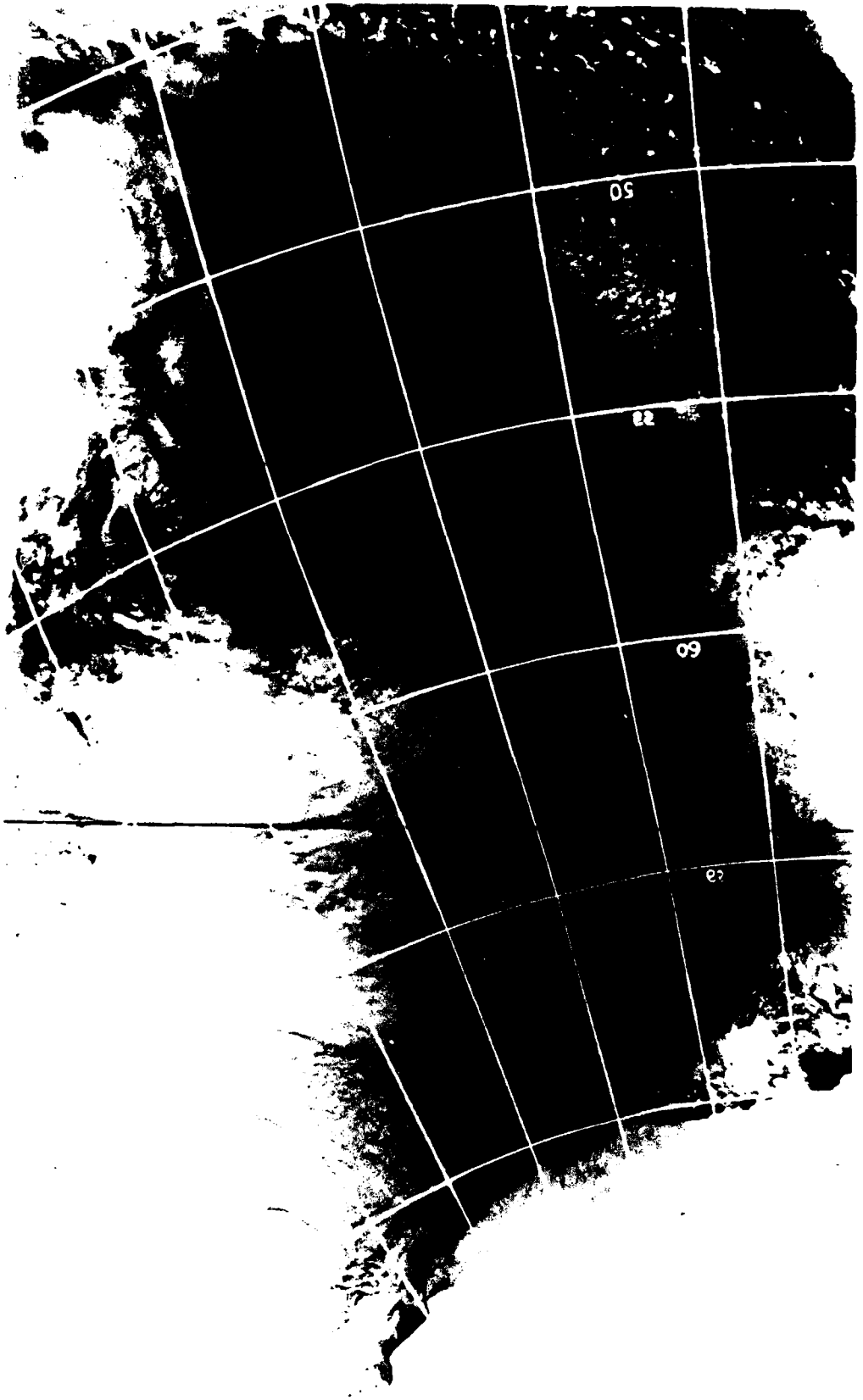
HOUR	REMARKS FROM ICE OBSERVATION LOG
0135	10 tenths concentration.
0400	10 tenths concentration.
0500-0700	10 tenths concentration.
0800	9-10 tenths concentration. Leads. Some fog, grease ice in leads.
0900	10 tenths concentration. Some leads. Occasional rubble field/pressure ridges.
0952	Wide band of grey-white ice 10-15 cm thick. Some small ridges and open water.
1022	Wide thin ice areas appear to be locally converging.
1030	Traversing grey-white ice in recent lead. Lots of new ridges (blue cast) indicating recent compression at lead edges.
1401	Stopped in relatively thin young ice (20-30 cm). Lots of new ridges, open water, nearby alternating compressed and diverged areas. Blue ice ridges.
1632	Broke through into lead (>100 m in some parts). Grease ice plumes herded into "tadpole" shapes. Wind from South.
1648	Traversing lead; some rough spots.
1801	Traversing 1 m thick first year floe, 10 tenths concentration.
1904	First year and young ice.
1957	Traversing lead with new ice forming. First year floes; some ridging.
2208	First year floes with ridges.


-50°
-40°
-30°
-20°
-10°
0°
10°
TV M2-5 27 10 81 11h23'30 ГМТ

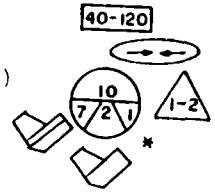
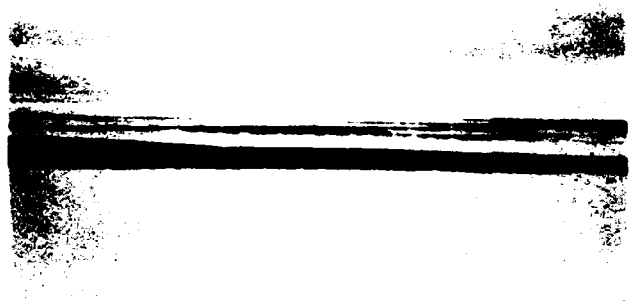
DATE	HOUR	SYMBOLS
23 Oct 81		
(23.x)		

DESCRIPTION OF SYMBOLS

HOUR	REMARKS FROM ICE OBSERVATION LOG
0400-0500	In lead, open water, 10 tenths concentration.
0600	In lead to another lead.
0700	Open water, large lead, grease ice.
1049	Traversing floes between lead section. Ice >1 m some ridges especially new at edges of refrozen leads.
1700	Ship stopped in heavy ice, compression and heavy ridging.
0256	Wide lead with thin ice (> 300 m).



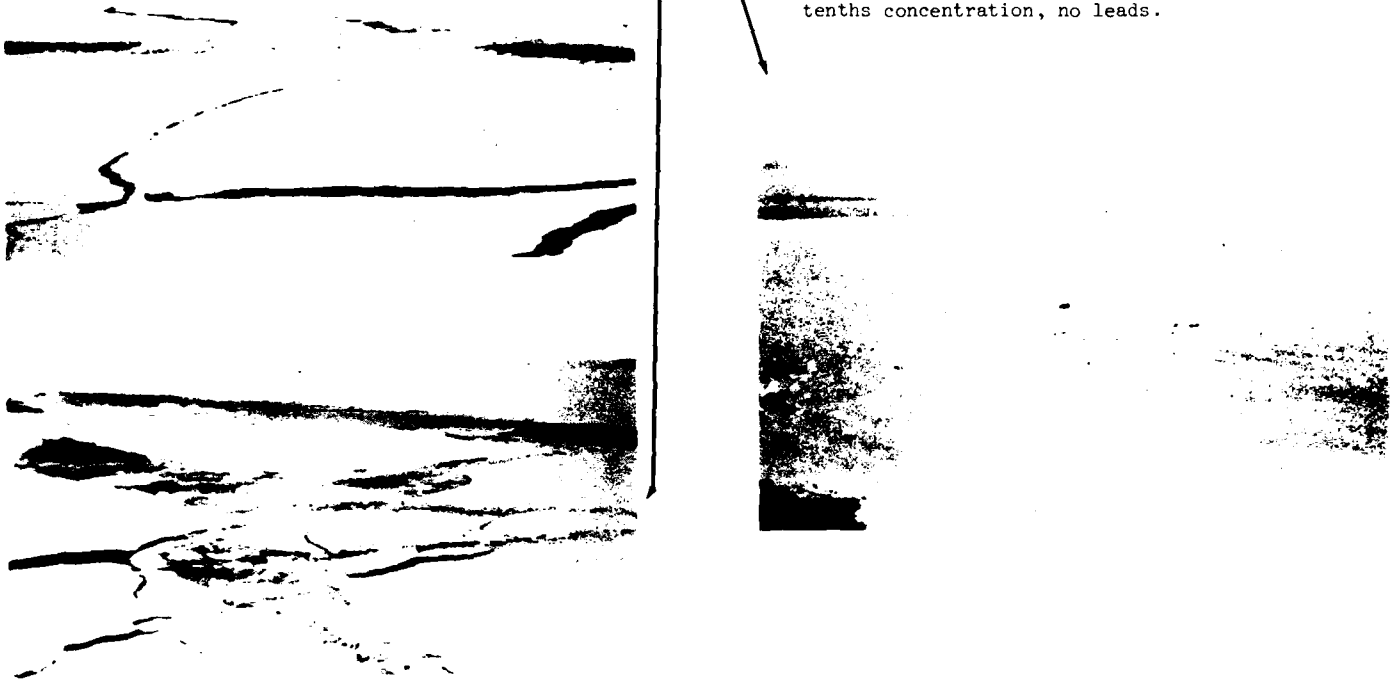
TV M2-5 28 10 x1

DATE	HOUR	SYMBOLS	DESCRIPTION OF SYMBOLS	HOUR	REMARKS FROM ICE OBSERVATION LOG
29 Oct 81 (29.x)	1000 (10^h 00^m)		Average ice thickness 40-120 cm. Compression zone. Ridging 1-2 concentration (1-5 scale). 10 tenths concentration composed of 7 tenths large floes (0.5-2 km diameter, 120 cm thickness); 2 tenths large floes (0.5-2 km diameter, 30-70 cm thickness); and 1 tenth light nilas 5-10 cm thick.	1050	Traversing some grey-white ice in leads 10 tenths concentration.
				1431	Traversing narrow lead in first year ice.
				1654	10 tenths concentration. Very few narrow leads. Lower topography and less ridges than previously observed. Ice station, cores 7 and 8.

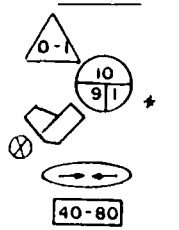
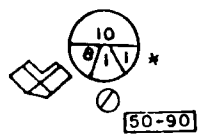
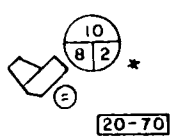
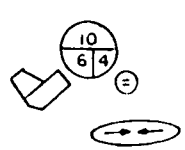
-10° 0° 10°

GMT

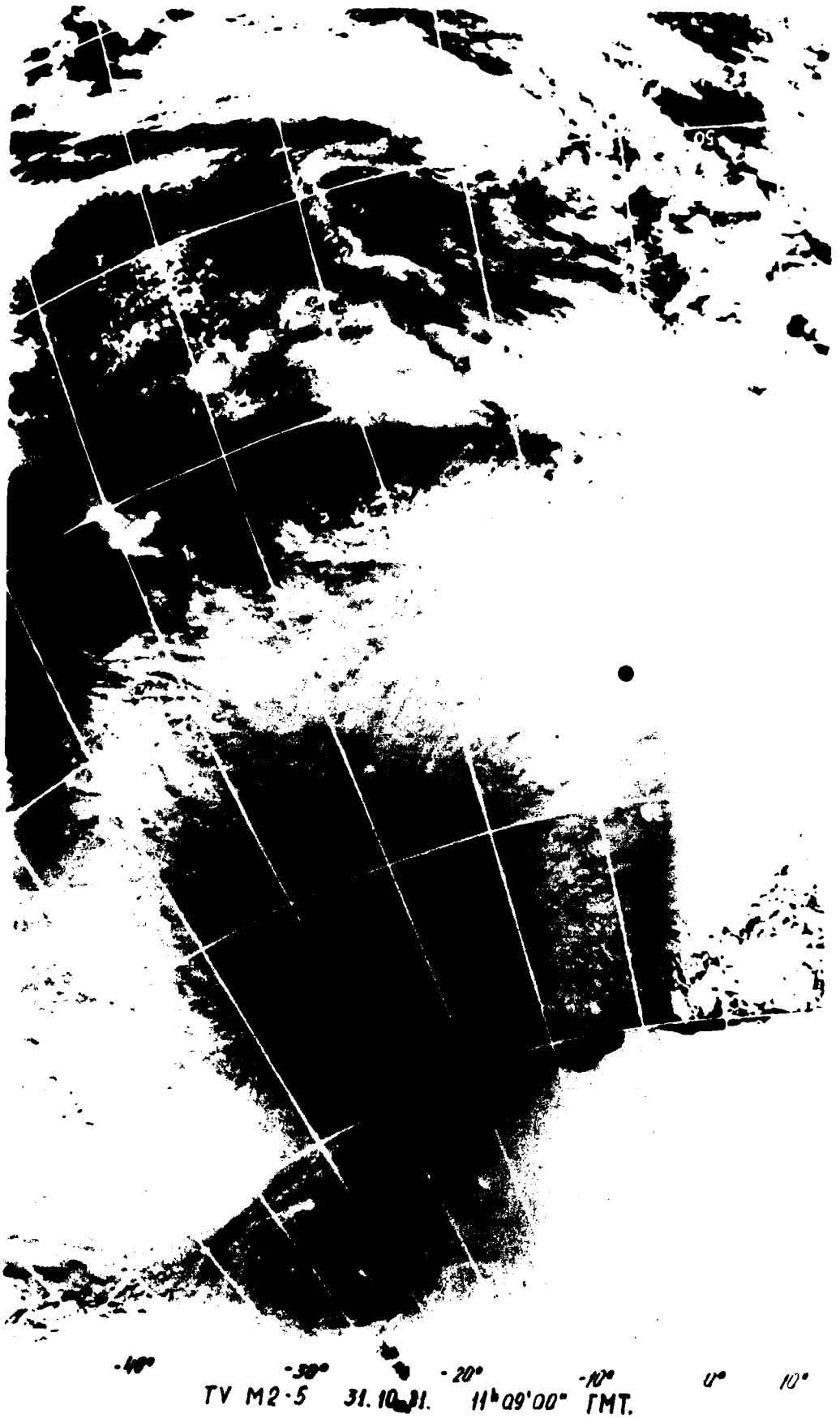
DATE	HOUR	SYMBOLS	DESCRIPTION OF SYMBOLS	HOUR	REMARKS FROM ICE OBSERVATION LOG
30 Oct 81 (30.x)				0800	In thick ice. Narrow to no leads.
				1521	Refrozen leads under compression. Lots of blue ridges. No open leads.
				1800	*In wide refrozen lead, 5-15 cm thickness*, 10 tenths concentration, no leads.



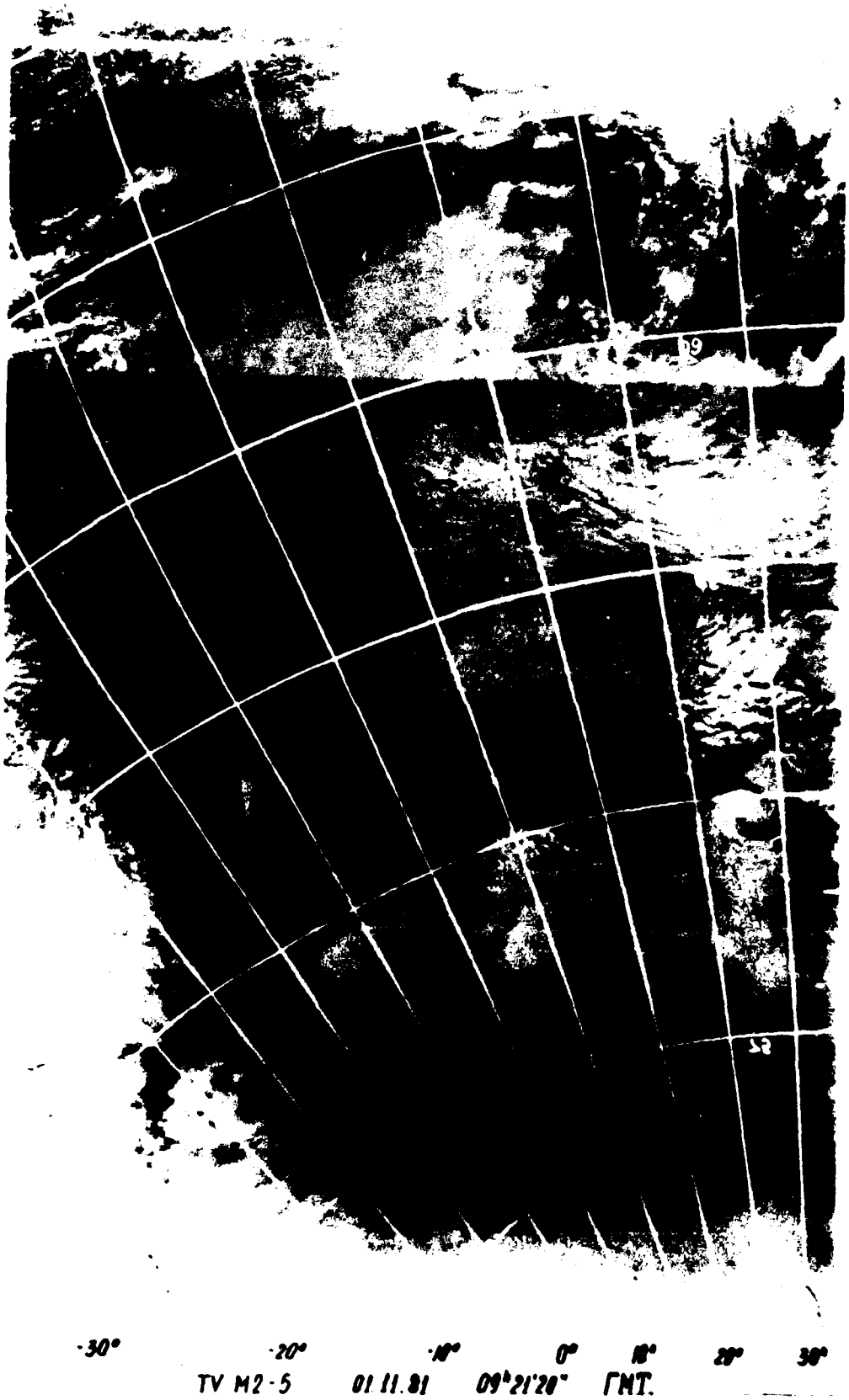
TV M2-5 30.10.81. 11h12'50" ГМТ

DATE	HOUR	SYMBOLS	DESCRIPTION OF SYMBOLS
31 Oct 81 (31.x)			Ridged ice 0-1 concentration (scale 0-5). 10 tenths concentration composed of 9 tenths large floes (0.5-2 km diameter, 30-70 cm thickness) and small floes (20-100 m diameter, 70-120 cm thickness); and light nilas 5-10 cm. Compression zone. Average ice thickness 40-80 cm.
			10 tenths concentration consisting of 8 tenths large floes (0.5-2 km diameter, 70-120 cm thickness); 1 tenth small floes (20-100 m diameter, 30-70 cm thickness); and 1 tenth light nilas 5-10 cm. Average ice thickness 50-90 cm.
			10 tenths concentration consisting of 8 tenths large floes (0.5-2 km diameter, 30-70 cm thickness) and small floes (20-100 m diameter, 15-30 cm thickness); and 2 tenths light nilas (5-10 cm). Average ice thickness 20-70 cm.
	1750 (17^h 50^m)		10 tenths concentration consisting of 6 tenths large floes (0.5-2 km diameter, 30-70 cm thickness) and 4 tenths small floes (20-100 m diameter, 15-30 cm thickness). Compression zone.
			Ship drifting

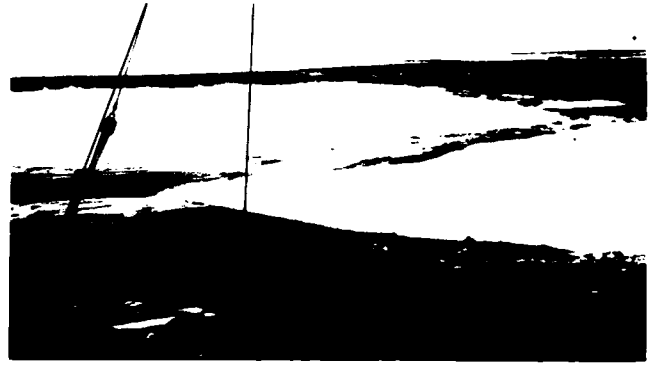
HOUR	REMARKS FROM ICE OBSERVATION LOG
0800	Light snow.
1346	In rubble field with fairly large ridge.
1622	In SE trending lead.
1704	Wide leads. Traversing open water.
1852	Traversing an approximately 300 m wide lead. New ice ridges and open water.
2040	Large lead open water, fetch > 500 m upwind of mast location.

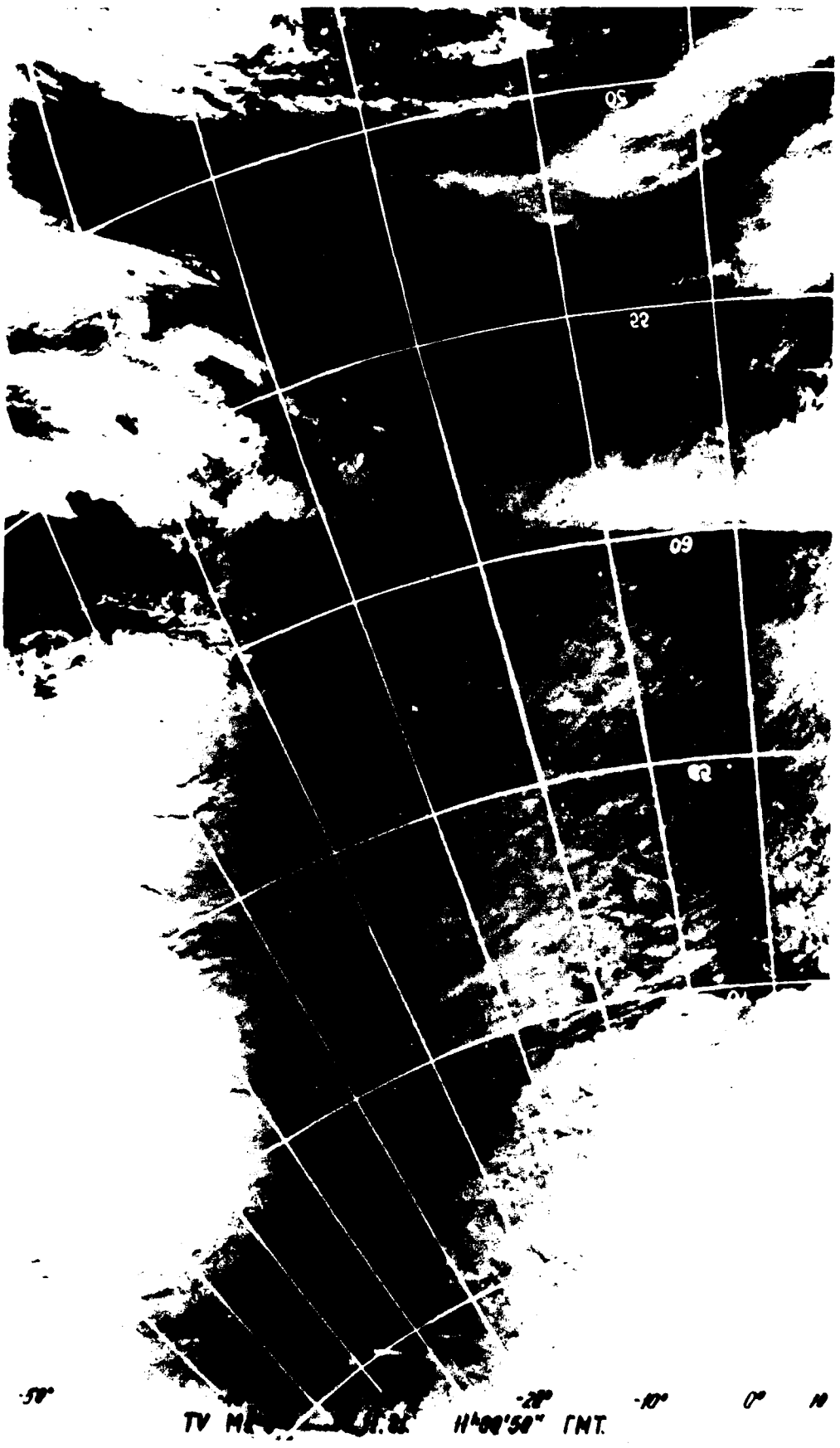

50
-40°
-30°
-20°
-10°
0°
10°
TV M2-5 31.10.81. 11h09'00" GMT.

DATE	HOUR	SYMBOLS	DESCRIPTION OF SYMBOLS	HOUR	REMARKS FROM THIS INTERVAL
1 Nov 81 (1.x1)				←0715	Traversing 200 m lead, concentration 4 tenths.
				0818	Approximately 7 tenths concentration ice.
				1100	Very heavy ridging between two giant floes.
				1310	Ice station, Poles 9, 10 and 11.
				1800-1900	Moved down a wide lead (+ 400 m) to the east. Saw more of the same (lead-ridges-lead).

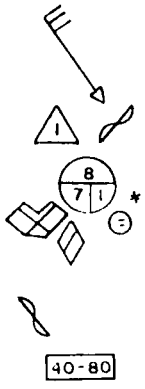

-30°
-20°
-10°
0°
10°
20°
30°
TV M2-5 01.11.81 09h21'20" ГМТ.

DATE	HOUR	SYMBOLS	DESCRIPTION OF SYMBOLS	HOUR	REMARKS FROM ICE OBSERVATION LOG
2 Nov 81				←0805	Wide lead (500 m), some new ice, some broken 20-40 m diameter floes within the lead. Temperatures moderate (0- -2°C), wind strong. Polynya continued to be open.
[illegible]				1200	



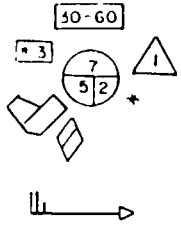

50
55
60
65
-50°
-20°
-10°
0°
N
TV M
H+00'50" GMT

DATE	HOUR	SYMBOLS	REMARKS FROM ICE OBSERVATION LOG
3 Nov 81	0406		Some new ice formation on polynya.
	1537		Traversing small lead canal into larger lead, 10 tenths concentration, large (km diameter) first year floes.



Wind NW, 15 m/s.
Very small fracture (0-50 m).
Ridging (1 on 0-5 scale).
8 tenths concentration consisting of 7 tenths large floes (0.5-2 km diameter, 70-120 cm thickness) and medium floes (100-500 m diameter, 30-70 cm thickness); and 1 tenth small floes (20-100 m diameter, 15-30 cm thickness) and light nilas (5-10 cm). Very small fracture (0-5 m).
Average ice thickness 40-60 cm.

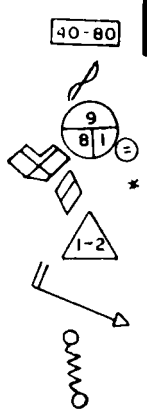
1502	Ice conditions approximately 9 tenths concentration. Traversing relatively wide leads.
1605	Wide leads, open water conditions, 7-8 tenths concentration.
1722	Thinner ice of less than 9 tenths concentration. Lots of open water, low ridging.
2135	Refreezing leads, concentration 9 to 10 tenths.
2212	Some breaking, refreezing leads, concentration 7-8 tenths.
2300	Some leads, new ice forming.



Average ice thickness 30-60 cm.
Snow encrusted ice 3 (scale 0-3).
7 tenths concentration with 5 tenths large floes (0.5-2 km diameter, 30-70 cm thickness) and medium floes (100-500 m diameter, 30-70 cm thickness) and 2 tenths light nilas (5-10 cm).
Some ridging (1 on 0-5 scale).
Wind from W, 12 m/s.


-30°
-20°
-10°
0°
10°
20°
TV M2·5 03. 11. 81. 09h13'40" TMT.

A...	RUN	TYPE ...	DESCRIPTION OF SYMBOLS
...			

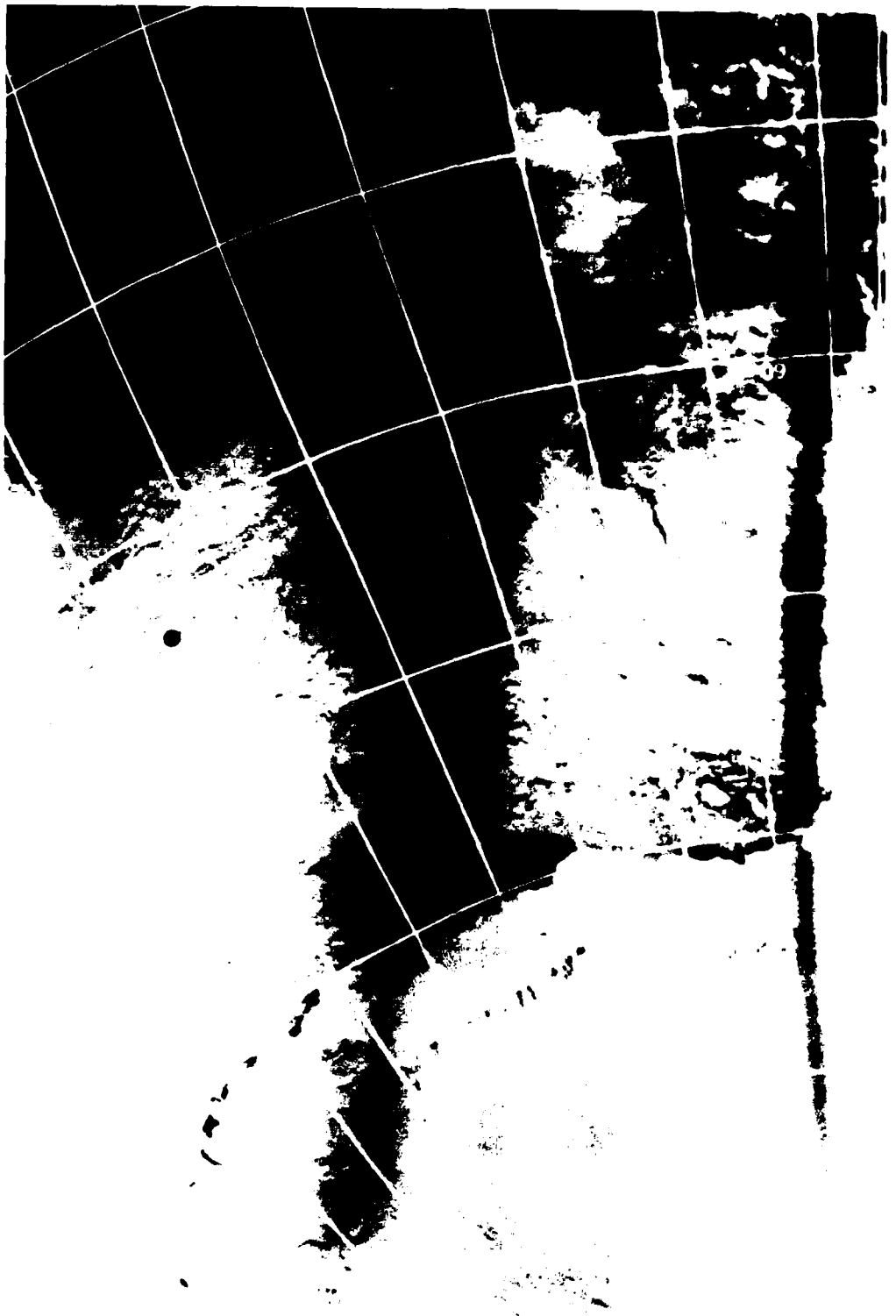


1410
(14h 10m)

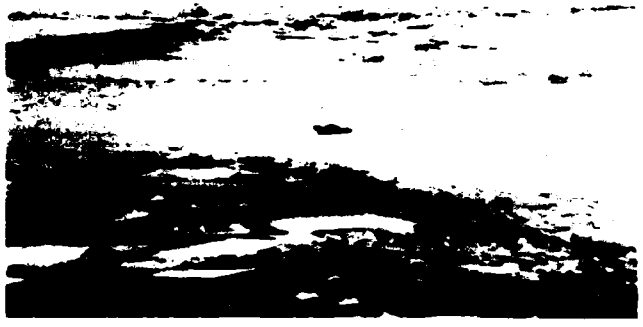
Average ice thickness 40-80 cm.
Very small fracture (0-50 m).
9 tenths concentration consisting of
8 tenths large floes (0.5-2 km diameter,
70-120 cm thickness), medium floes
(100-500 m diameter, 30-70 cm thickness);
and 1 tenth small floes (20-100 m diameter,
15-30 cm thickness) and light nilas (5-10
cm).
Some ridging (1-2 on 0-5 scale).
Wind NW; 10 m/s.
Ship drifting.

HOUR	REMARKS FROM ICE OBSERVATION LOG
0700	Heavy ice.
0800	10 tenths concentration, some leads.
0946	Following leads, some heavy ice, 10 tenths concentration.
1202	9-10 tenths concentration or wide leads in 10 tenths concentration.
1351	In several miles long and 2 mile wide lead or polynya.

1556	In small field of thick floes (approximately 1 m).
1610	Field of thick floes.
2316	Ice station, cores 12, 13, 14 and 15.


-30°
-20°
-10°
0°
10°
20°
30°
TV M
411.M.
09°09'15" ГМТ.

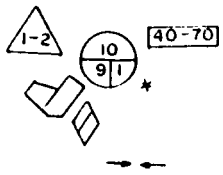
DATE	HOUR	SYMBOLS	DESCRIPTION OF SYMBOLS
5 Nov 81 (5.x1)			

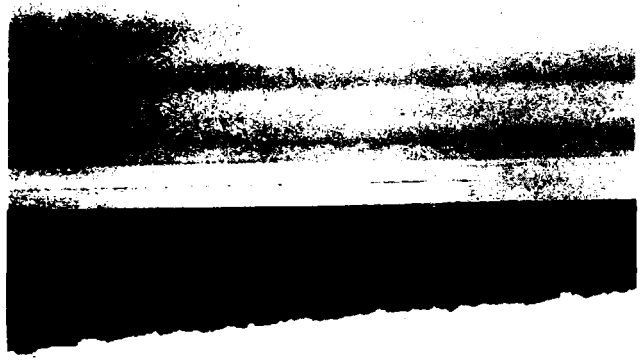


1500

1500


22
-30°
-20°
-10°
0°
10°
20°
TV M2-5 05.11.81 09ᵏ05'15" ГМТ

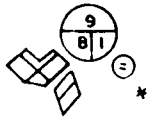
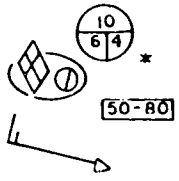
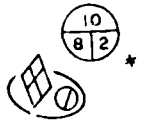
DATE	HOUR	SYMBOLS	DESCRIPTION OF SYMBOLS
6 Nov 81 (C.xl)	1520 (15[h] 20[m])		Average ice thickness 40-70 cm. Ridging 1-2 (scale 0-5). 10 tenths concentration consisting of 9 tenths large floes (0.5-2 km diameter, 30-70 cm thickness) and medium floes (100-500 m diameter, 30-70 cm thickness); and 1 tenth light nilas (5-10 cm). Ice converging.



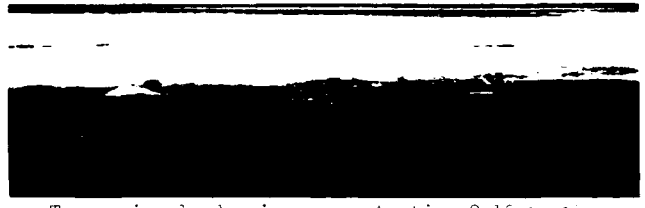
HOUR	REMARKS FROM ICE OBSERVATION LOG
1305	Concentration 9-10 tenths, traversing leads.
1500	Traveling with leads, 9-10 tenths concentration.

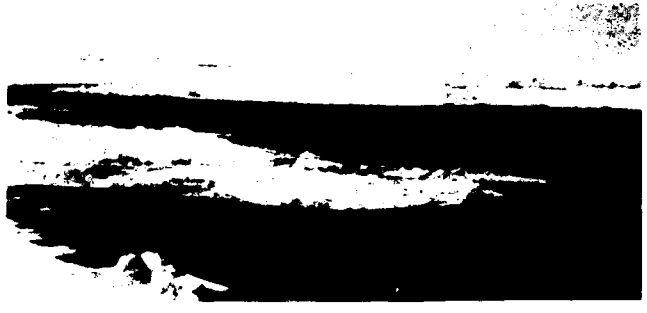
NOTE: There was no satellite photo

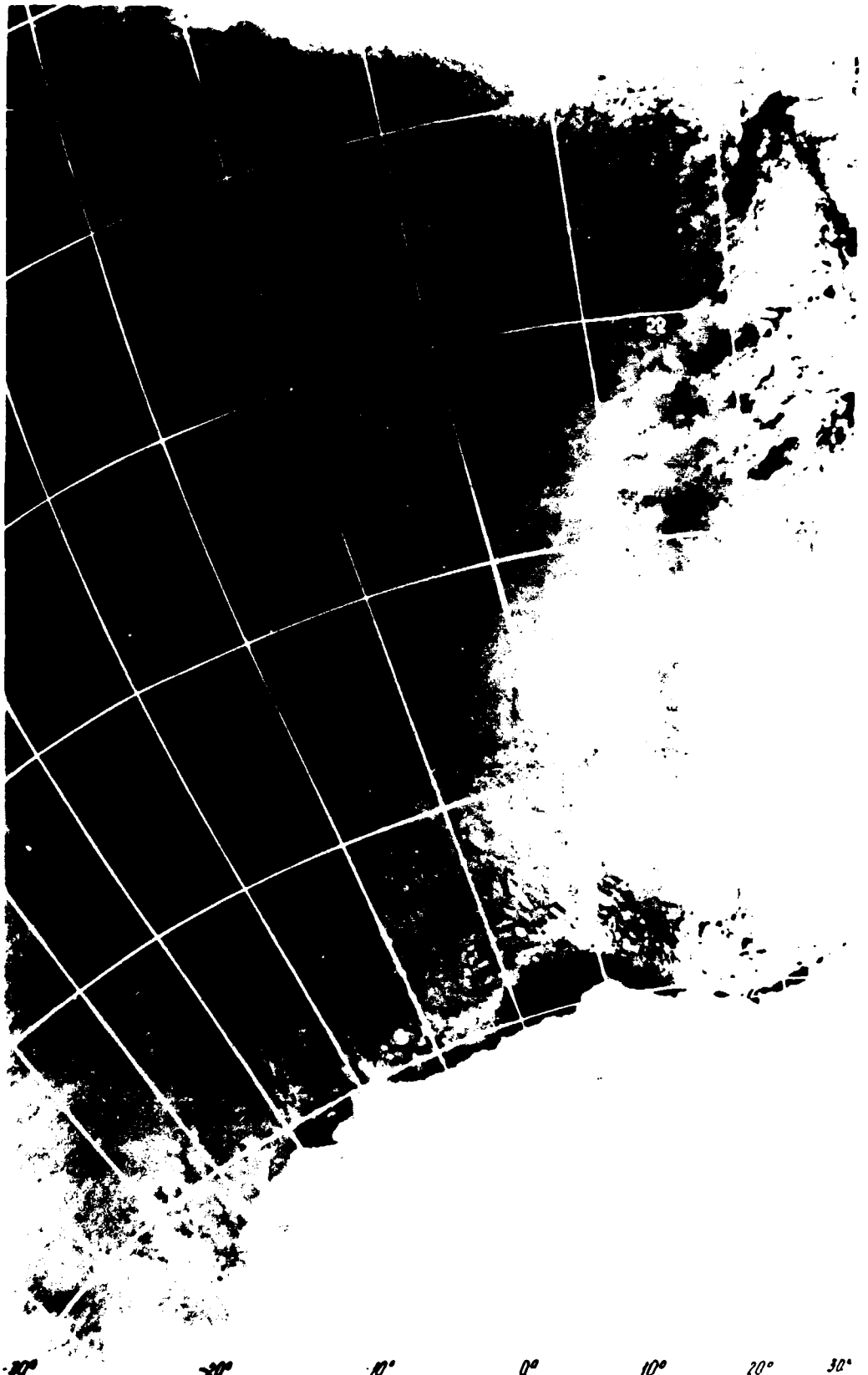
available for 6 November 1981.

DATE	HOUR	SYMBOLS	DESCRIPTION OF SYMBOLS
7 Nov 81 (7.x1)			9 tenths concentration consisting of 8 tenths large floes (0.5-2 km diameter, 70-120 cm thickness), medium floes (100-500 m diameter, 30-70 cm thickness); and 1 tenth small floes (20-100 m diameter, 15-30 cm thickness) and light nilas (5-10 cm).
	1330 (13^h 30^m)		10 tenths concentration consisting of 6 tenths ice Breccia made up of medium floes (100-500 m diameter, 70-120 cm thickness) and small floes (20-100 m diameter, 30-70 cm thickness); and 4 tenths light nilas (5-10 cm). Wind from W, 7 m/s. Average ice thickness 50-80 cm.
			10 tenths concentration consisting of 8 tenths ice Breccia of medium floes (100-500 m diameter, 70-120 cm thick) and small floes (20-100 m diameter, 30-70 cm thickness); and 2 tenths light nilas (5-10 cm).

DATE	REMARKS FROM ICE OBSERVATION LOG
1303	Traversing leads, concentration 9-10 tenths.
1605	Traversing leads, ice concentration 9-10 tenths.



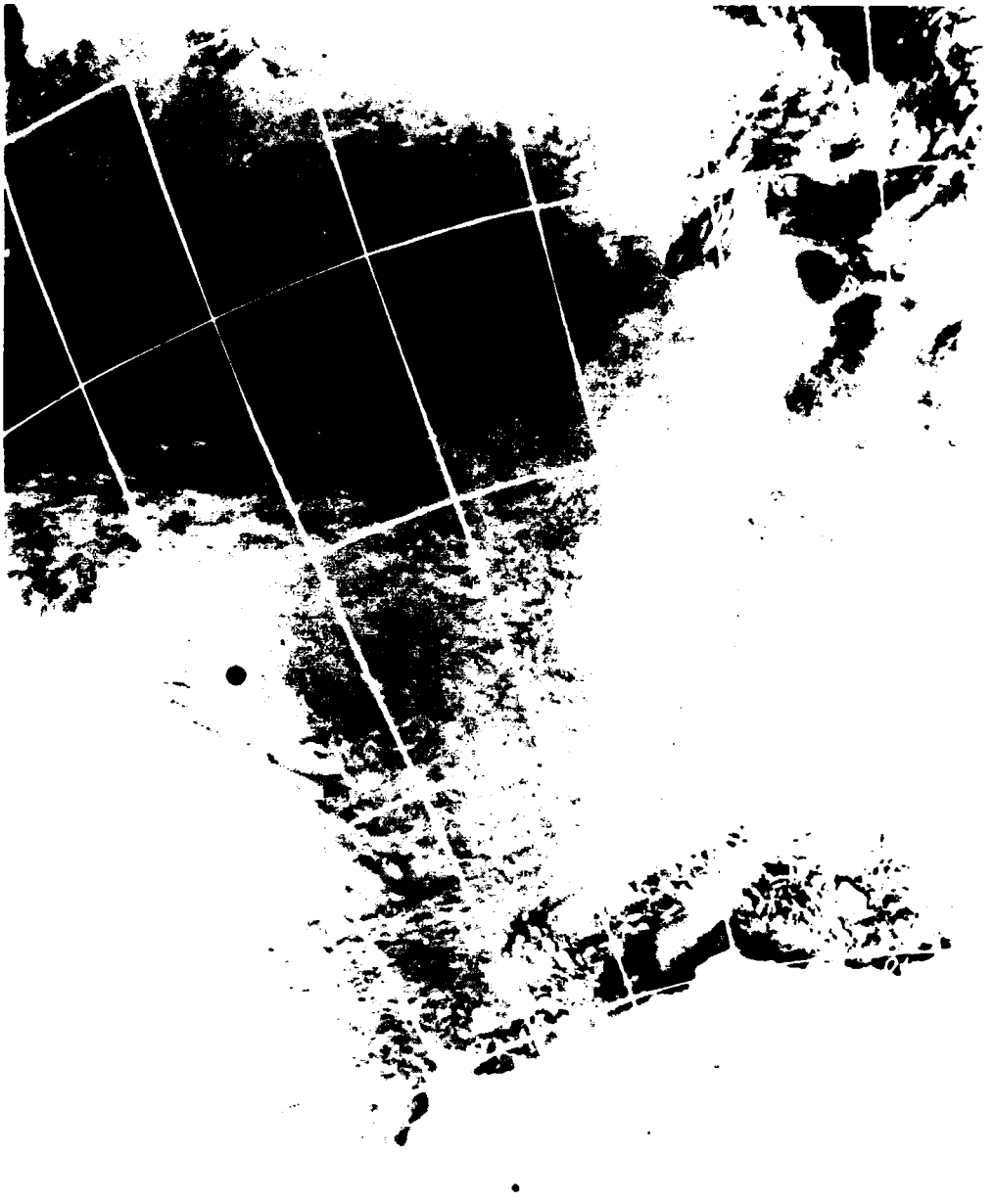




TV M2-5 07 11 81 08ʰ58'40" ГМТ

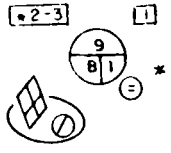
DATE	HOG n	SYMBOLS	DESCRIPTION OF SYMBOLS
[illegible]		1 / 40-80	Ridging 1 (scale 0-5). Average ice thickness 40-80 cm. Salt flowers, concentration 1 (scale 0-3). Wind from N, 10 m/s.
[illegible]	1500		

HOUR	REMARKS FROM OBSERVATION LOG
0800	Traversing leads in 9-10 tenths concentration.
1310	Traversing leads in 9-10 tenths concentration.
1800	Ice station, area 1 and 2.



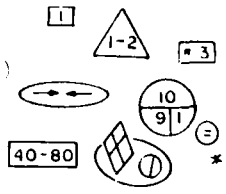
-40° -30° -20° -10° 0° 10° 20°

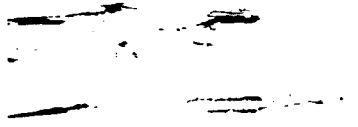
TV МР-5 08.11.81 08ʰ53'40'' ГМТ

DATE	HOUR	SYMBOLS	DESCRIPTION OF SYMBOLS
[illegible] Nov 81 [illegible]			
[illegible] [illegible]			Rotting ice concentration 1 (scale 0-5). Snow encrusted ice 2-3 concentration (scale 0-3). 9 tenths concentration composed of 8 tenths medium floes (100-500 m diameter, 70-120 cm thickness) and small floes (20-100 m diameter, 30-70 cm thickness); and 1 tenth small floes (20-100 m diameter, 15-30 cm thickness) and light nilas (5-10 cm).

HOUR	REMARKS FROM ICE OBSERVATION LOG
1200	First year ice, some leads.
1340	Less open water, lots of refrozen leads.
1800	Traversed area of open water to thin ice to thin ice with compression. New ridges. Ice station, cores 18 and 19.

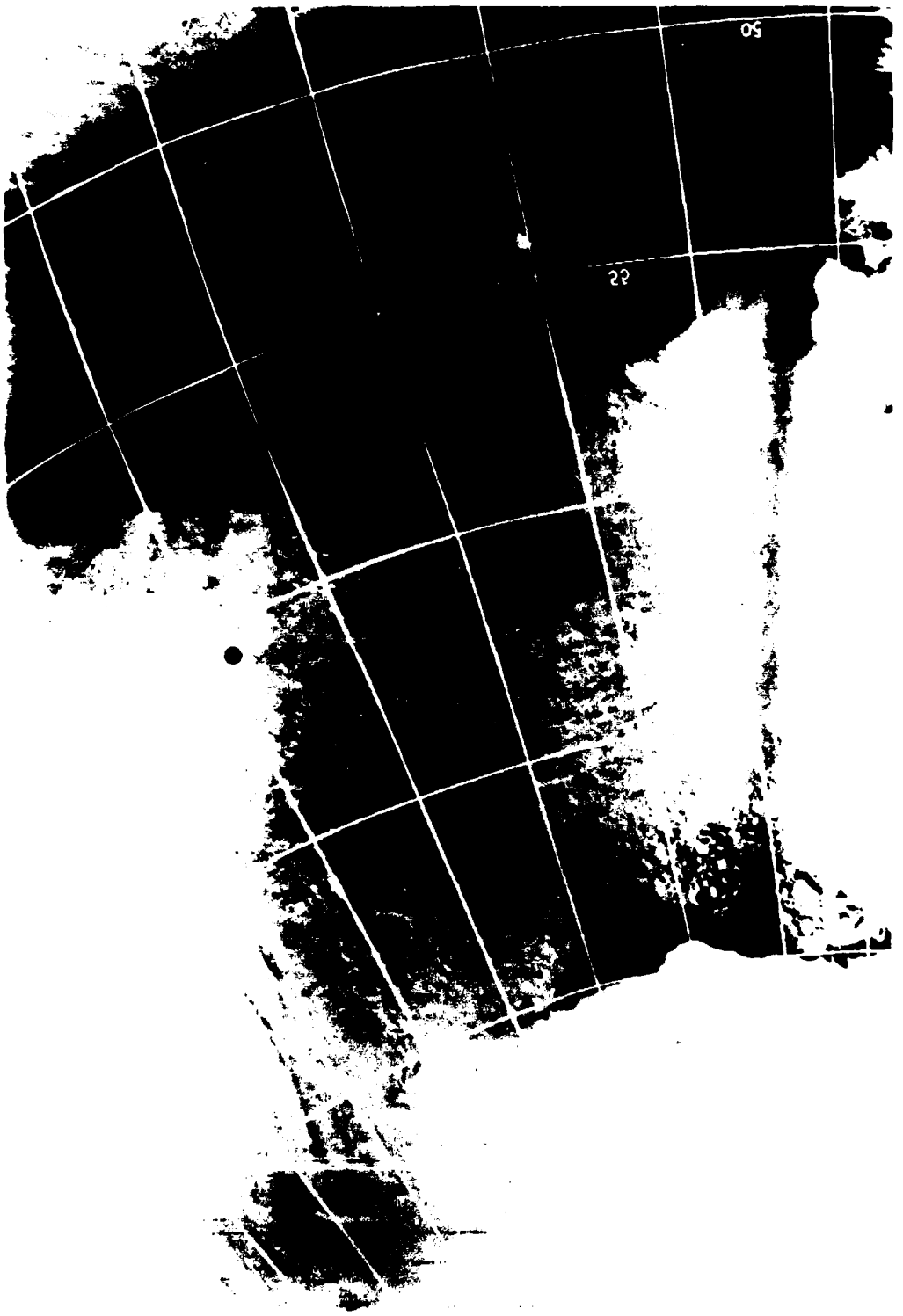

-20°
-10°
0°
10°
20°
TV . M2-5
06h49'25" ГМТ.

DATE	HOUR	DESCRIPTION OF SYMBOLS
19 Nov 81 (19.x1)	1520 (15^h 20^m)	 Rotting ice 1 concentration (scale 0-5). Ridging 1-2 concentration (0-5). Snow encrusted concentration 3 (scale 0-3). Compression zone. 10 tenths concentration composed of 9 tenths ice Breccia made up of medium floes (100-500 m diameter, 70-120 cm thickness) and small floes (20-100 m diameter, 30-70 cm thickness); and 1 tenth small floes (20-100 m diameter, 15-30 cm thickness) and light nilas (5-10 cm). Average ice thickness 40-80 cm.



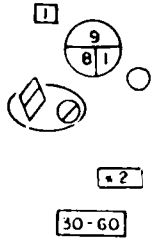
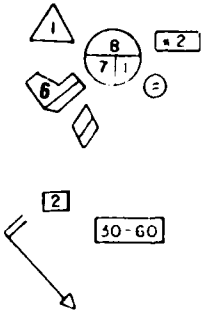
HOUR	REMARKS FROM ICE OBSERVATION LOG
1040	Ice station, cores 20 and 21.
1520	9-10 tenths concentration. Starting to get more large floes/open water structure of 100's of meters dimension rather than kilometers wide.

2215 Ice station, cores 22 and 23.



-30° -20° -10° 0° 10° 20°

TV M2·5 10.11.81. 08h 46'15" GMT.

DATE	HOUR	SYMBOLS	DESCRIPTION OF SYMBOLS
11 Nov 81 11.xl)			Rotting ice 1 concentration (0-5 scale). 9 tenths concentration consisting of 8 tenths ice Breccia of medium floes (100-500 m diameter, 30-70 cm thickness) and small floes (20-100 m diameter, 30-70 cm thickness); and 1 tenth small floes (20-100 m diameter, < 5 cm thickness). Snow encrusted ice concentration 2 (0-2 scale). Average ice thickness 30-60 cm.
1[illegible]			Ice ridging 1 concentration (0-5 scale). Snow encrusted ice concentration 2 (0-3 scale). 8 tenths concentration composed of 7 tenths of medium and large floes of which 6 tenths was large floes (0.5-2 km diameter, 30-70 cm thickness) and 1 tenth medium floes (100-500 m diameter, 30-70 cm thickness). The other 1 tenth was small floes (20-100 m diameter, 15-30 cm thickness). The wind is NW, 10 m/s. Rotting ice concentration 2 (0-5 scale). Average ice thickness 30-60 cm.

HOUR	REMARKS FROM ICE OBSERVATION LOG
	
0700	8-9 tenths concentration. Large floes but [illegible] up to km. Lots of open water.
0757	Floes and open water [illegible] tenths concentration.
0900	Stopped in thicker floes.
1032	Ice station, cores [illegible] m.
1208	Stopped in heavily ridged ice. [illegible], visibility poor.
1733	Traversing lead in thick first year ice, [illegible] floe size change. Entering [illegible] edge region.
	
2000	Field of [illegible] interspersed with [illegible]


-30°
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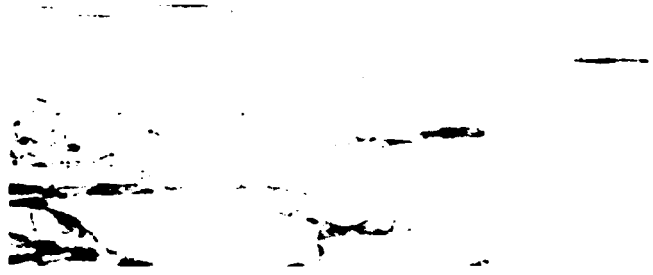
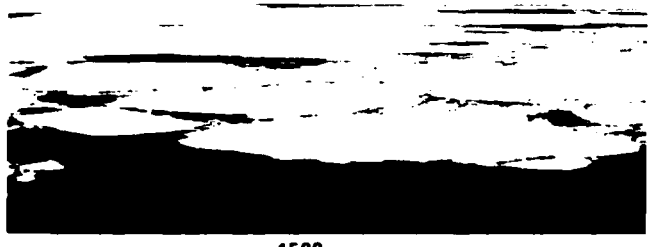
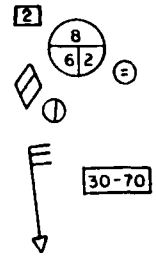
TV M2-5
11.11.81.
08ᵏ42'30"
ГМТ.

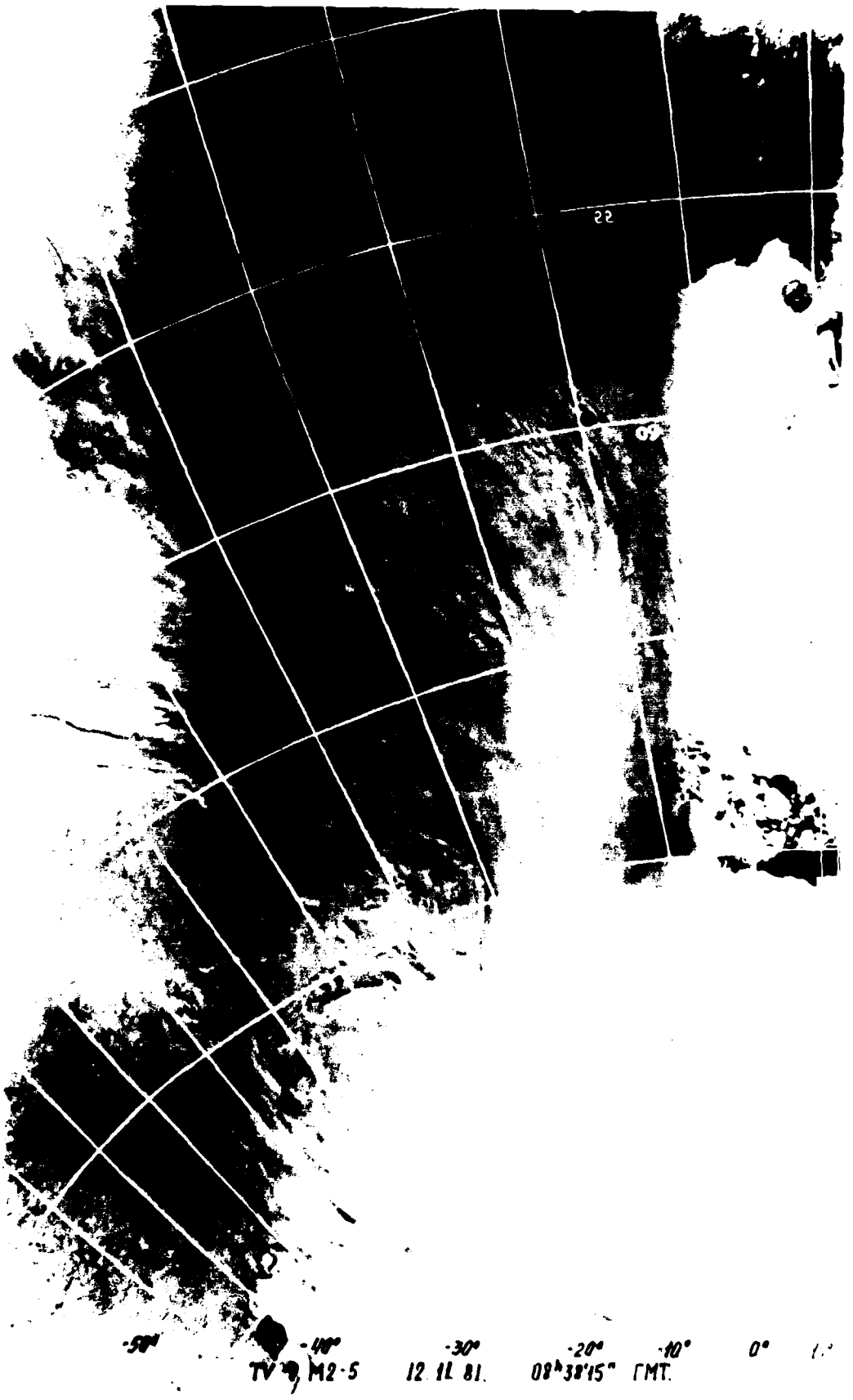
DATE	HOUR	SYMBOLS	DESCRIPTION OF SYMBOLS	HOUR	REMARKS FROM ICE OBSERVATION LOG
12 Nov 81 (12.x1)				0648	Large floes, some open water, thin ice patches. Ice thickness seems less, reflecting recent divergence. Various floes (100-1000 m) separated by open water, thin ice 9 tenths concentration.
				0805	Transitioning to ice edge, some swell, concentration locally about 7-8 tenths prior to entering more concentrated belt.
				0840	Some swell beginning. Traversing floes and open water/thin ice sequences.
				0952	Broken floes approximately 50-100 m diameter. Lots of thin ice 7-10 tenths concentration.
				1200	Ice floes with open water between 7-10 tenths concentration.
	1330 (13^h 30^m)	0-1 / 30-70 / 9 / 8 / 1 / 6	Average ice thickness 30-70 cm. Ridging concentration 0-1 (scale 0-5). 9 tenths concentration composed of 8 tenths large floes and small floes 6 tenths of the 8 tenths are large floes (0.5-2 km diameter, 30-70 cm thickness), 2 tenths are small floes (20-100 m diameter, 30-70 cm thickness); and 1 tenth of total 9 tenths is small floes (20-100 m diameter, 15-30 cm thickness).		
		8 / 6 / 2 / 40-70 / 1	8 tenths concentration consisting of 6 tenths large floes (concentration 2/ 0.5-2 km diameter, 30-70 cm thickness); 2 tenths small floes (20-100 m diameter, 30-70 cm thickness). Average ice thickness 40-70 cm. Salt flowers, concentration 1 (0-5 scale).		
				1730	Small to medium floes, thin ice, 7-8 tenths concentration.





1500

DATE	HOUR	SYMBOLS	DESCRIPTION OF SYMBOLS	HOUR	REMARKS FROM ICE OBSERVATION LOG
12 Nov 81 (12.x1)				2000	In ice edge region. Exclusively young ice of less than approximately 30 cm thickness. Ridging down. Concentration 9-10 tenths.
	2050 (20^h 50^m)		Rotting ice concentration 2 (scale 0-5). 8 tenths concentration consisting of 6 tenths medium floes (100-500 m diameter, 30-70 cm thickness) and small floes (20-100 m diameter, 30-70 cm thickness); and 2 tenths small floes (20-200 m diameter, 15-30 cm thickness). Average ice thickness 30-70 cm. Wind from the N, 15 m/s.		


-50°
-40°
-30°
-20°
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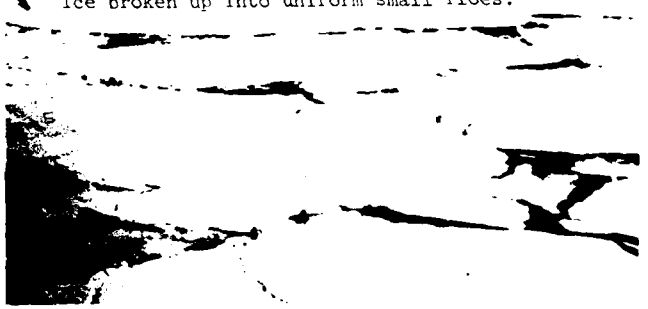
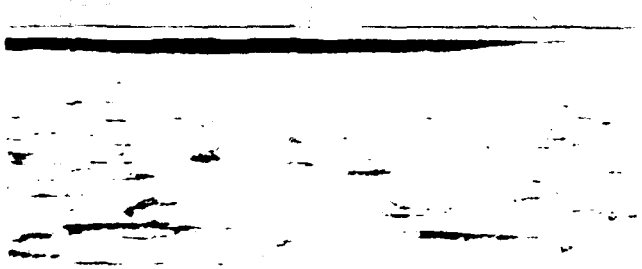
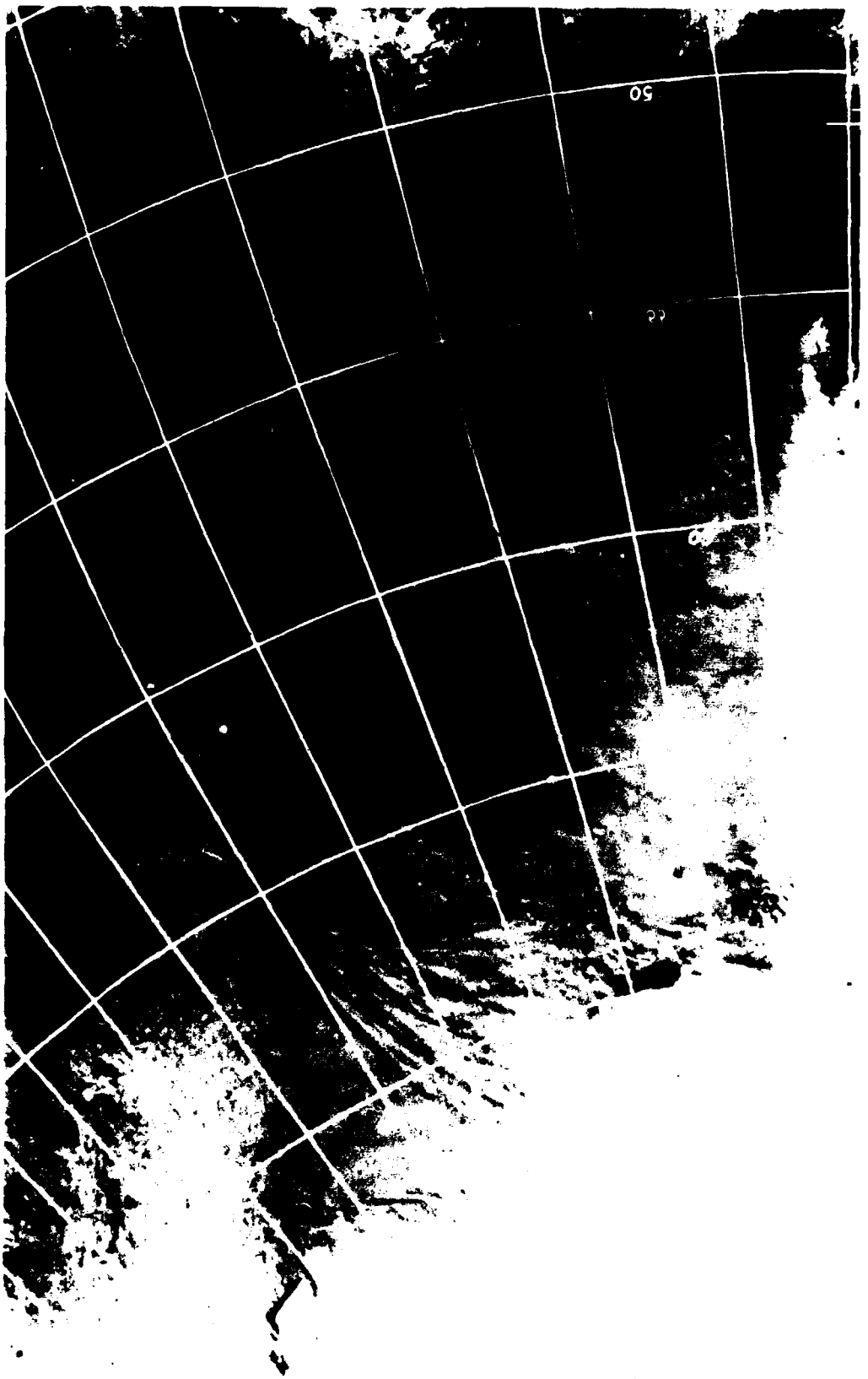
0°
TV M2-5 12.11.81. 08h38'15" ГМТ.

DATE	HOUR	SYMBOLS	DESCRIPTION OF SYMBOLS	HOUR	REMARKS FROM ICE OBSERVATION LOG
13 Nov 81 (13.xl)				0200	Floes of older ice thickness (.5-.7 m) imbedded in younger ice. Ice station, cores 26 and 27.
				0400	Mostly young ice, some surface melting, small floe sizes. Band of .5 m thick ice.
				0608	Entering region of uniform angular floes of about 20-30 m diameter.
				0717	Ice broken up into uniform small floes.
	0915 ($09^h\ 15^m$)	1 2 8 30-60	In ice edge region. Rotting ice concentration 2 (0-5 scale). Snow encrusted ice concentration 1 (scale 0-3). 8 tenths concentration small floes (20-100 m diameter, 30-70 cm thickness) and ice cakes (2-20 m diameter, 30-70 cm thickness). Average ice thickness 30-60 cm. Wind NW, 17 m/s. Ship drifting.		
				2036	Small floes alternating with open water patches.
	2040 ($20^h\ 40^m$)	5 5-6 3	Bergy water at ice edge region, concentration 5 and 3 (scale 0-9). 5-6 tenths concentration small floes (20-100 m diameter, 30-70 cm thickness). Ice cakes (2-20 m diameter, 30-70 cm thickness), and brash ice (< 2 m diameter).		
				2300	Traveling through ice edge region, alternating patches of broken ice, open water.






-30°
-20°
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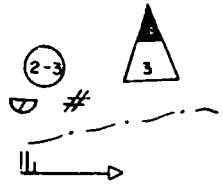
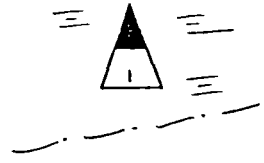
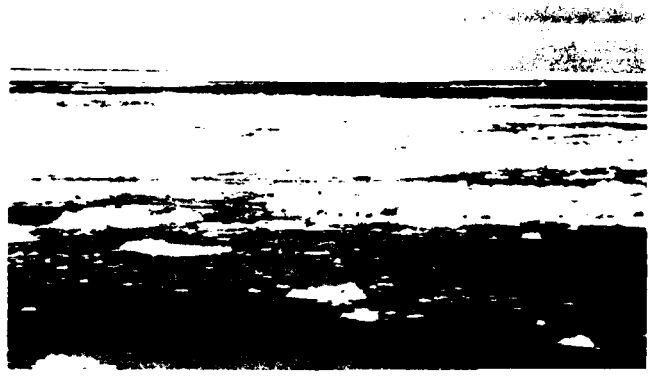
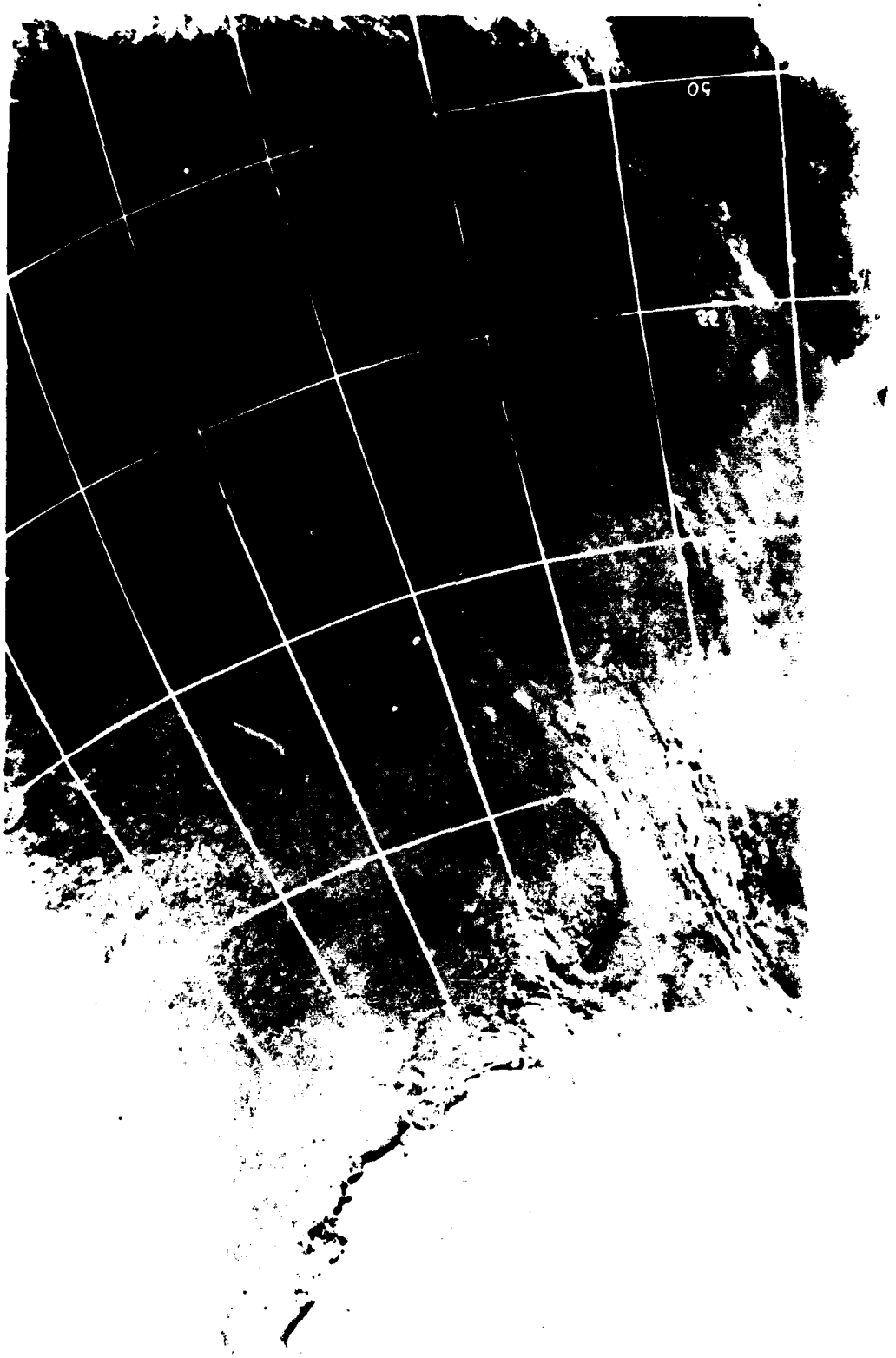
10°
TV M2-5 08 34'50 GMT 13.11.81.

DATE	HOUR	SYMBOLS	DESCRIPTION OF SYMBOLS
14 Nov 81 (14.x1)	0200 (02^h 00^m)		Ice berg concentration 3 (0-9). 2-3 tenths concentration ice cakes (2-20 m diameter, 30-70 cm thickness) and brash ice (< 2 m diameter) at ice edge region. Wind from W, at 12 m/s.
	0830 (08^h 30^m)		Ice edge region. Icebergs concentration 1 (0-9 scale). Entering open water.



HOUR	REMARKS FROM ICE OBSERVATION LOG
0200	Traveling through ice edge region, alternating patches of broken ice open water.
0400	Increasing open water.
0430	Bands of ice at 100% concnetration alternating with open water.
0503	Bands and strips, small bits in water.
0508	Small bands of ice.
0615	Plumes from belts of more concentrated ice.
0645	More widely separated belts of ice. Several small bergs.
0654	More extensive bands, highly concentrated within the band, some floes >.5 m diameter.
0700	Field of small broken floes 10 tenths concentration pancakes and congealed slush between.
0705	Entering open water again.
0715	Icebergs.
0811	Field of 1 m chunks of ice.
0820	Different swell character. End of ice.


50
-30°
-20°
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TV MR-5 14.11.81 08h38'45" GMT


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